Erin Welsh

We want to start with a disclaimer that throughout this series we feature explanations and stories that include some heavy material, including early pregnancy loss, stillbirth, and other traumatic experiences of pregnancy, childbirth, and the postpartum period.

Katherine

Hi, my name is Katherine and I'm really excited to share my birth story with you guys. I had a totally healthy, totally normal pregnancy. Nothing was wrong, there was no inclination that anything was going to be different about my baby when she was born. I come from a line of moderately tall people with an outlier, my brother being 6'7", he is the tallest person in my entire family and we don't really know where it came from. So I was very curious to know how big my baby was going to be. And I had asked around my 36 week appointment if they had any idea how big she was going to be. I'd been measuring normal my entire pregnancy. And they said it's kind of hard to tell unless there's something very abnormal like she's very small or very large, it's kind of a surprise how big they're going to be within that like 6-8 pound range that babies usually are.

And I was very large when I went into labor, I went into labor at 40 weeks and 5 days. So I just thought I was really, really pregnant, I didn't think anything of it. But when they started doing cervical checks while I was in labor, the doctor told me that he was feeling what he thought was going to be a 9 pound baby. And I said excuse me? Because I had no idea I was going to have that big of a baby, like I had even asked. And I did fail my first glucose check when we were doing them during pregnancy but I passed the 2nd 3 hour test. So they weren't really concerned. I was never diagnosed with gestational diabetes. So you can imagine my surprise. I'm dilating and I'm getting an epidural and everything was going really normal.

I pushed for almost 4 hours and I started just getting really fatigued. My epidural was kind of wearing off and it wasn't really working that well so the doctor suggested setting up for a vacuum assist delivery, which is where they literally use a suction cup to suction to the baby's head to help you pull them out. And there's some complications that can come with that. So they brought in some extra hands and it was a little nerve-wracking. And I was actually able to push her out on my very last push before they were gonna start the vacuum assist. Everybody was all in their sterile field and everything and I was able to push her out.

And I ended up having a 10 pound 0.01 ounce baby girl who was a 96th percentile for weight and 91st percentile for height. And to this day she's three and a half and she's still at the very top of her growth curve, she's probably almost 45 pounds and she's over 3 ft tall. She's a very tall girl. So we're gonna be really excited to see how tall she ends up the older she gets. But that's my birth story about how I almost had a vacuum assist and a surprise 10 pound baby.

Nicole C.

Hi, I'm Nicole C. and this is my birth story. I had a pretty uneventful pregnancy. My water broke 2 days before my due date. I did everything I could to avoid birth drama. I chose the best hospital for me, I researched my rights, I took the hospital's classes, I hired a doula, and I made a birth plan that I gave out to absolutely everyone. But none of that was enough in the end. My baby was angled wrong. Even as I dilated and progressed, she would not descend into the birth canal. Ultimately she began to struggle. As I later learned she had meconium aspiration syndrome or MAS. After 27 hours of labor, I had no choice but to undergo a C-section. Exhausted, scared, and devastated, I was ripped away from my husband and doula and wheeled into the operating room.

	During the C-section, I had my support people back but still felt in the dark. I had no idea what was happening down there at any given stage and was wholly unprepared for my current reality. After a few minutes, my baby, my Katie, emerged, purple and with an iron grip on the umbilical cord. There was no crying. They rushed her over to a separate area in the corner of the room. I had a video monitor where I could watch them work on her as my team continued to work on me. After a few minutes she was rushed off to the NICU. My husband went with her. It was basically my worst nightmare of birth. Thankfully after some initial help breathing and 5 days in the NICU, Katie came home, healthy, strong, and loud. She's 9 months old now and absolutely thriving.
	Even once I knew she was okay though, I continued to grieve for the birth experience I imagined. For the initial bonding time I'd missed, for my baby's first cry, for the opportunity to share that experience with my husband. I felt like I failed, like I should have done more. I think the rhetoric around C-sections definitely contributed to my birth trauma and feelings of failure. All I heard ahead of time about them was how they're done way too much these days and how you should challenge doctors who recommend them or even consider switching OBs. In many cases, C-section discussion was sidestepped at every turn. It was like don't worry about that or think about it too much, it's super unlikely you'll need one and it's best not to scare yourself thinking about it. As if I was some delicate flower wholly unequipped to hear anything that wasn't sunshine and rainbows instead of an adult human who best case scenario was about to go through vaginal labor and delivery.
	I wish I had fought through the patronizing rhetoric, did more C-section research, and prepared myself for any possibility. Knowledge is empowering. Just as fed is best in the breastfeeding vs formula discussion, safe and healthy is best in the vaginal delivery vs C-section discussion. Every case, every birthing parent, and every baby is different. Every route to birth is valid. We all did the hardest thing. Don't let anybody, even your own brain, tell you you failed.
TPWKY	(This Podcast Will Kill You intro theme)
Erin Welsh	Thank you all so much for sharing your stories with us. It really truly means the world and thank you to everyone who submitted a firsthand account. We really did read each and every one of them and We feel honored. Like it feels truly unbelievable and in the best way possible that so many people reached out to us. And we tried to include as many stories as we could. And so throughout this episode and the next episode, the last episode in our series, you will hear more firsthand accounts.
Erin Allmann Updyke	Yeah, thank you seriously so much to every single one of you for writing in. So many of you sent in your stories that you recorded that we weren't able to include. And we are eternally grateful.
Erin Welsh	Yeah.
Erin Allmann Updyke	They really do mean the world to us and we listened to and read every single one. So thank you.
Erin Welsh	Eternally grateful is... Yeah.
Erin Allmann Updyke	Very accurate.
Erin Welsh	Yeah, very accurate. Hi, I'm Erin Welsh.
Erin Allmann Updyke	And I'm Erin Allmann Updyke.

Erin Welsh	And this is This Podcast Will Kill You.
Erin Allmann Updyke	Coming to you from the Exactly Right studios to record the third episode about pregnancy.
Erin Welsh	I know.
Erin Allmann Updyke	In our four episode series.
Erin Welsh	It's been really fun so far.
Erin Allmann Updyke	I've loved it.
Erin Welsh	And the fact that we're doing this on video is really cool too.
Erin Allmann Updyke	Because it makes you wanna barf.
Erin Welsh	We get some props.
Erin Allmann Updyke	Yes!
Erin Welsh	Which is really, really fun. So if you are like wanting to see what's going on when we're talking-
Erin Allmann Updyke	Yeah.
Erin Welsh	Which if you don't, that's okay too. But if you do, head to YouTube.
Erin Allmann Updyke	Head to YouTube. I have some really good props for this episode, guys. I made them myself.
Erin Welsh	The last episode too.
Erin Allmann Updyke	I did in the last one.
Erin Welsh	There was the tennis ball, yeah.
Erin Allmann Updyke	No, that was the first episode.
Erin Welsh	Oh my god.
Erin Allmann Updyke	I know, it was a lot.
Erin Welsh	Yeah, yeah. My mind has blurred.
Erin Allmann Updyke	Last episode was the placenta. It was great.
Erin Welsh	Oh the placenta.
Erin Allmann Updyke	Yeah, yeah, yeah.

Erin Welsh	Yeah, that was good. Okay.
Erin Allmann Updyke	So it's going to be a fun day today, Erin.
Erin Welsh	It is. And before we get into the episode, we want to share a few words about what these four episodes will cover more broadly. And if you've already tuned into our first or second episode in the series, this is all going to sound familiar to you. But in case this is your first time tuning in, welcome and we've got a few things that we want to share. So we're going to talk about what we will cover in each of these episodes, the language that we'll be using, and our overall goals with creating this series. So we decided early on to dedicate four episodes to cover pregnancy, one for each trimester which is like very few episodes for such a tremendously huge topic.
Erin Allmann Updyke	I know. Yeah.
Erin Welsh	And yeah, we realized very early on that we're not going to be able to cover everything that we would possibly want to with pregnancy. And so throughout researching for these episodes, we started to jot down like oh we want to cover this in a future episode and cover that. And so if there are topics that you want more information on, please reach out.
Erin Allmann Updyke	Yeah.
Erin Welsh	We'll add them to our list, our ever growing list. And we will be covering more pregnancy related topics in the future.
Erin Allmann Updyke	Yeah, for sure.
Erin Welsh	Yeah.
Erin Allmann Updyke	This series has not and it will not by the end answer every single question that you could have about pregnancy or cover every experience that a person might have during their pregnancy. In large part because pregnancy is such an individual experience, as you heard from all of our firsthand accounts.
Erin Welsh	Yeah.
Erin Allmann Updyke	But what we aim to do with this whole series is take you through some of the broad changes that people might experience during pregnancy, childbirth which is what we're talking about today, and the postpartum period which will be next week's episode. And then also explore some of the historical and evolutionary aspects of pregnancy and childbirth. So each episode thus far has roughly corresponded to each trimester.
Erin Welsh	Very roughly.
Erin Allmann Updyke	Very roughly. In our first episode we covered how you even know whether or not you're pregnant and what that means and what's happening in very early embryonic development.
Erin Welsh	And our most recent episode, last episode, our second episode, we talked about the amazing organ that is the placenta.
Erin Allmann Updyke	We love it.

Erin Welsh	Yes.
Erin Allmann Updyke	Do you love it now? Have you listened to that?
Erin Welsh	Once you do, you will love it.
Erin Allmann Updyke	You will love it.
Erin Welsh	Yeah.
Erin Allmann Updyke	I feel confident in that.
Erin Welsh	Absolutely.
Erin Allmann Updyke	There you go.
Erin Welsh	I agree.
Erin Allmann Updyke	It's pretty phenomenal.
Erin Welsh	And then we also talked about some of these broad system body changes that happen during pregnancy system by system and including focusing on some complications that can arise.
Erin Allmann Updyke	Which I guess might make you not like the placenta a little bit too.
Erin Welsh	It's a complicated...
Erin Allmann Updyke	It is.
Erin Welsh	We have complicated feelings about the placenta. But we also appreciate its amazingness.
Erin Allmann Updyke	Its amazingness.
Erin Welsh	Yeah.
Erin Allmann Updyke	Definitely. Today's episode, which we're very excited about, will focus on childbirth itself. So labor and different modes of delivery and the history of the cesarean section. Erin.
Erin Welsh	Oh my gosh, there is so much to cover.
Erin Allmann Updyke	I'm literally so excited.
Erin Welsh	Yeah, yeah. Okay, our fourth episode which is next week, and it's our season finale, this will be about the concept of the 4th trimester which is a really fascinating topic.
Erin Allmann Updyke	Yeah.

Erin Welsh	And so we're going to be exploring some of the changes that can happen after pregnancy and talking this big picture history of how we moved childbirth from the home to hospital and some of the consequences of that.
Erin Allmann Updyke	We intend for all of these episodes to be inclusive of all families and we recognize that not everyone who experiences pregnancy identifies as a woman. So we try as much as we can in all of these episodes to use gender neutral language such as 'pregnant person', while at the same time we recognize that much of what we discuss when it comes to medical bias during pregnancy and childbirth historically and in present day is a result of gender discrimination and racism. So in those contexts we may also use the term 'woman' or 'women' and throughout these episodes we'll be using terms like 'mother' or 'maternal' and 'paternal', as these are what are used in the scientific and medical literature.
Erin Welsh	We also want to acknowledge that there is no such thing as a normal pregnancy.
Erin Allmann Updyke	There's not just one.
Erin Welsh	There's not just one. There's not just one textbook example of this is how a pregnancy should go.
Erin Allmann Updyke	Right, yeah.
Erin Welsh	But we also want to provide a baseline for the expected changes that happen, the expected physiologic and anatomic changes, so that we can understand when things kind of maybe go outside of those boundaries and then what happens. And this kind of helps us to understand what complication actually means.
Erin Allmann Updyke	Right, exactly. Okay, that was a lot.
Erin Welsh	All right, that was a lot.
Erin Allmann Updyke	All of our disclaimers and information.
Erin Welsh	Thanks for sticking with us throughout that.
Erin Allmann Updyke	Yeah. I'm really excited about today but first-
Erin Welsh	But first. I almost forgot, Erin.
Erin Allmann Updyke	We can't forget.
Erin Welsh	I was like let's get started.
Erin Allmann Updyke	It's quarantini time.
Erin Welsh	It is. What are we drinking this week?
Erin Allmann Updyke	We're drinking the same thing.
Erin Welsh	We are.

Erin Allmann Updyke	Great Expectations. We're not actually drinking it right now but we have drunk it.
Erin Welsh	It is so good.
Erin Allmann Updyke	It is better than we expected.
Erin Welsh	We can't reveal our secrets. Our lack of confidence in our recipe-making.
Erin Allmann Updyke	It is very good.
Erin Welsh	Yeah.
Erin Allmann Updyke	And we made a placeborita with blackberry ginger ale, lemon, mint.
Erin Welsh	Lemon, mint.
Erin Allmann Updyke	There's a video on YouTube of us making it.
Erin Welsh	Yes!
Erin Allmann Updyke	Which was very fun to make.
Erin Welsh	It was really fun, it was really fun.
Erin Allmann Updyke	And Georgia Hardstark provided a wonderful quarantini for us to go with this episode.
Erin Welsh	Yes.
Erin Allmann Updyke	So that is available on YouTube too, please check it out.
Erin Welsh	The Ontini.
Erin Allmann Updyke	Ontini, it has a name now.
Erin Welsh	It's very cute. Oh my god, it was so much fun.
Erin Allmann Updyke	It was really fun.
Erin Welsh	Yeah. So you can find recipes; you can find those videos on YouTube and we'll also have recipes on our social media so make sure you're following us there, as well as our website thispodcastwillkillyou.com.
Erin Allmann Updyke	This is the third time in a row you've sent it to me.
Erin Welsh	I can say what's on our website.
Erin Allmann Updyke	No, let me do it. Let me do it. Ready? On our website thispodcastwillkillyou.com you can find incredible things such as merch.

Erin Welsh	Merch.
Erin Allmann Updyke	You can find links to our bookshop.org affiliate account and our Goodreads list which Erin Walsh curates. You can find transcripts from each and every one of our episodes. You can find our Bloodmobile who does the music for every one of our episodes.
Erin Welsh	Nice recovery.
Erin Allmann Updyke	Thank you. Panicked. You can find a contact us form and a firsthand account form.
Erin Welsh	There's probably more.
Erin Allmann Updyke	All of the sources from each and every one of our episodes.
Erin Welsh	Yeah. And there might be more. Tell us what we missed. Go check out our website.
Erin Allmann Updyke	Go check out our website.
Erin Welsh	Be like you didn't mention this.
Erin Allmann Updyke	I thought you meant me and I was like I don't know what I missed, Erin.
Erin Welsh	Thispodcastwillkillyou.com.
Erin Allmann Updyke	Thispodcastwillkillyou.com. Also a thing I always forget to do is thank you to everyone who has rated and reviewed us on Apple Podcasts or Spotify or wherever you like to listen. If you haven't and you want to take a minute to do that, we'd really appreciate it because it helps us out.
Erin Welsh	It helps us out. Yeah.
Erin Allmann Updyke	Thanks for listening!
Erin Welsh	Thanks for listening!
Erin Allmann Updyke	Let's stop talking so that we can start talking.
Erin Welsh	I love that plan. Let's take a quick break and then we'll really get started.
Erin Allmann Updyke	Okay.
TPWKY	(transition theme)

Laura	Hi, I'm Laura and this is my pregnancy story. To begin, we've got to rewind briefly to April 2018. I was 27 and diagnosed with HER2-positive breast cancer. I didn't really have the time or funds to do any fertility preservation, so I opted to take a monthly shot to try to preserve my fertility which put me into essentially early menopause. I did chemo through the summer and fall and then opted for a double mastectomy that October. I got the news from my doctor that Halloween that I was cancer free. Part of me sometimes wishes I'd kept my breast tissue but ultimately I wanted to be here for any future children and not worry about a recurrence, especially given my family history.
	Fast forward to October of 2021. We're in the thick of COVID. I found out I was pregnant. I didn't have the typical pre-pregnancy symptoms like sore breasts that prompt some people to take a test. I had some mild nausea and was so tired and my period was a little late. So I took a test and it was super positive. Other than the morning sickness that went away sometime during my 2nd trimester, luckily I had a really smooth pregnancy and I felt my most beautiful during that time. Funny enough, I didn't get any of the stereotypical cravings of pickles and peanut butter or other weird food concoctions but I really wanted a turkey sub and fruits and veggies. Honestly I've never eaten so healthy in my life.
	Along the way I encountered some judgment from people when I requested no breastfeeding supplies at my baby shower. For those that didn't know I didn't have real boobs anymore, it didn't make sense to them why I wouldn't at least try to breastfeed my baby. So that's sort of one thing I wish I could bond with other moms over but ultimately I'm happy with my decision. So now it's July 5th, 2022, I'm 39 weeks pregnant, it's 11 pm, and I'd finally laid down for bed after nesting and cleaning my whole house that day. Even being sick with COVID, I just tested positive the day before. I got up because I felt the urge to pee and in true dramatic fashion, just like the movies, my water broke in a huge gush. Of course my hospital bag wasn't packed so I frantically finished packing and headed for the hospital. I was checked in pretty immediately and in a labor room by midnight.
	Because both my partner and I were positive for COVID, we were quarantined to our room and we were in masks the whole time. Side note, it's not easy or fun to breathe through contractions with a mask on. I did my whole labor that way for nearly 30 hours, then it was time to push. And it's not fast like the movies. I pushed for almost 4 hours which felt like an eternity. Masks on, hard to breathe. My daughter was born at 2:38 in the morning on July 7th. She's my lucky 7/7 post-cancer miracle baby. Today my daughter's two and a half and one wild redhead little girl. I'm 6 years cancer-free and we're living our best life.
Jaden	My name is Jaden and I found out I was pregnant in January of 2024. Overall it was a very normal pregnancy. However at week 20 I started to measure on the high end of normal for my amniotic fluid. My baby was measuring large so we decided to set an induction date for 39 weeks. However a week after that there was a large increase in amniotic fluid, so we elected to schedule an induction for 38 weeks for polyhydramnios. The biggest worry was that I would go into labor naturally and there was a possibility of umbilical cord prolapse, which would then be an emergency. After my induction was started, I made no progress for about 14 hours.
	Because there was so much fluid, my baby was not able to exert enough pressure on my cervix to help advance labor. My waters were then manually broken and my labor started to progress. I labored that way for 18 hours and was finally ready to push. I pushed for 1.5 hours and made some great progress. The next 1.5 hours I made no progress and my baby was still at the same position. Because of this failure to descend and she was not yet in distress, we decided to go in for a C-section. The C-section was uncomplicated and my baby girl was born at 38 weeks and 2 days at 7 pounds 15 ounces. She is now a very healthy 4.5 month old.
TPWKY	(transition theme)

Erin Welsh	Childbirth in humans is difficult. It is long, it is painful, it carries with it significant risks to mother and baby. Afterbirth comes with its own set of challenges. Caring for a newborn that is largely helpless can be overwhelming.
Erin Allmann Updyke	Largely is an understatement. They are entirely helpless.
Erin Welsh	Entirely helpless. And these human experiences are exceptional compared to most but not all other mammalian or primate species. Why?
Erin Allmann Updyke	Why?
Erin Welsh	What did we do to deserve this? Why is it like this? Looking at the fossil record may give us part of the answer. So the story goes that our hominin ancestors evolved by pedalism, being able to move around on two feet rather than four. Why? I just keep going, why, why, why.
Erin Allmann Updyke	Yeah.
Erin Welsh	But why? Because maybe it allowed us to live in more varied habitats or acquire more varied food sources or it freed up our hands for tool use. There's many different ideas out there. But regardless of the reason, the shift to walking on two legs could only happen because of changes in the shape of our pelvis.
Erin Allmann Updyke	Our pelvis, Erin.
Erin Welsh	Our pelvis. And at some point after these anatomical changes, head size in our ancestors also grew as we got smarter.
Erin Allmann Updyke	After these pelvis changes.
Erin Welsh	After the pelvis changes.
Erin Allmann Updyke	Okay, okay.
Erin Welsh	And so that led to neonates with heads and bodies that were basically at the limit of the birth canal. But there was a cap on this growth in head and body size prenatally. Our pelvises could only change up to a certain point, past that point additional alterations could maybe compromise our bipedalism.
Erin Allmann Updyke	Right. Affect our fitness somehow.
Erin Welsh	Affect our fitness, yeah. I mean it's like if we needed the pelvis to expand, then we would lose the ability to like... The balance and the movement and the running.
Erin Allmann Updyke	Right. Right, right, right.
Erin Welsh	Yeah.
Erin Allmann Updyke	Trade-offs.

Erin Welsh	Trade-offs.
Erin Allmann Updyke	We always we always come back to it.
Erin Welsh	We always come back to it. And so instead evolution had to think outside of the box, shifting some parts of fetal growth to take place outside of the womb rather than in it, such as brain growth and neurodevelopment.
Erin Allmann Updyke	I love thinking of evolution in this very inaccurate way of giving it like agency.
Erin Welsh	Oh yeah.
Erin Allmann Updyke	Yeah.
Erin Welsh	No, I know. I think evolutionary biologists are like what are you doing?
Erin Allmann Updyke	Sorry. Stop it.
Erin Welsh	Evolution does not have agencies. Yeah, yeah. But I mean that is how I'm going to present it.
Erin Allmann Updyke	I love it. Yeah. It's a good way to just like in your mind frame it.
Erin Welsh	Listen, it's just... Yeah.
Erin Allmann Updyke	It's fine.
Erin Welsh	The end result is the same.
Erin Allmann Updyke	Exactly.
Erin Welsh	This is what happened.
Erin Allmann Updyke	This is what happened.
Erin Welsh	But this long period of neurodevelopment after birth might be what allows us to learn more and have flexibility in our learning.
Erin Allmann Updyke	Okay.
Erin Welsh	So at birth the brain size of a neonate is about 25% of what it'll be as an adult.
Erin Allmann Updyke	Wow.
Erin Welsh	Which is the smallest neonate adult proportion of all primates.
Erin Allmann Updyke	Like it is... Oh, of all primates.
Erin Welsh	Of all primates.

Erin Allmann Updyke	Okay, interesting, interesting.
Erin Welsh	Yeah.
Erin Allmann Updyke	So other primates, their brains come out already bigger.
Erin Welsh	Already bigger compared to their adult brain size.
Erin Allmann Updyke	Adult size. Okay, interesting.
Erin Welsh	And compared to other primates, our newborns seem especially helpless.
Erin Allmann Updyke	I know.
Erin Welsh	We can't cling, we can't hold our heads up, we can't coordinate our limbs, we can't even crawl for months.
Erin Allmann Updyke	I know.
Erin Welsh	Months!
Erin Allmann Updyke	And you think of like the baby monkeys who can just go and hold on so well.
Erin Welsh	Right. Yeah.
Erin Allmann Updyke	And ours can just do this palmar grasp reflex and you're like thank you!
Erin Welsh	Yeah, good job. You're working hard.
Erin Allmann Updyke	I know. We do work hard.
Erin Welsh	It's true. Some researchers suggest that to match the developmental stage of other apes right after birth, humans would have gestation 7-12 months longer than our 9 month gestation.
Erin Allmann Updyke	No thank you.
Erin Welsh	There is some current debate on this point.
Erin Allmann Updyke	Okay.
Erin Welsh	Yeah. There's there's nuance, there's papers.
Erin Allmann Updyke	Okay.
Erin Welsh	You can dig into it. Evolution seems to have handed us this trade-off where we get to have these big brains but we're also faced with the challenges of childbirth where the neonate is at the capacity of our birth canal and requires round the clock care for months after birth. This is a precarious balance to strike-

Erin Allmann Updyke	Yeah.
Erin Welsh	With extremely high costs if things go awry. How have we dealt with this over human history?
Erin Allmann Updyke	Tell me.
Erin Welsh	One way is through cooperation.
Erin Allmann Updyke	Ugh.
Erin Welsh	I know.
Erin Allmann Updyke	Humans and our cooperation.
Erin Welsh	Humans.
Erin Allmann Updyke	We are capable of it. Sorry.
Erin Welsh	We were capable of it. No, just kidding. I hope. Our hominin ancestors, like many of our present day primate relatives, exhibited cooperative breeding and culture. Did our helpless babies lead us to evolve this cooperation or did we already have this type of culture and that allowed for the evolution of more helpless babies?
Erin Allmann Updyke	Interesting.
Erin Welsh	We don't know.
Erin Allmann Updyke	That'd be hard to know, yeah.
Erin Welsh	We probably won't ever know that answer. But what is certain is that many societies today have lost that cooperative child rearing. Some researchers have suggested that we feel this helplessness in human infants so strongly because of the way that many of us experienced child rearing in our modern society, often isolated, with the burden of care falling to one or two people. This is far removed from how our ancestors would have experienced child rearing in a cooperative social group. Childbirth was the same way, attended by other members of your group. Like who knows how long women have been assisting other women in childbirth? But one paper I read suggested that when our species developed language, that helped to pave the way for assisted childbirth. We could communicate our pain, our needs, and then pass down the knowledge that we acquired.
Erin Allmann Updyke	Oh interesting.
Erin Welsh	Yeah. Today that kind of community involvement for child rearing seems more of a rarity. And when it's just you or you and one other person continuously on call to take care of a newborn, that may emphasize the never ending needs of that newborn. Okay, the second thing is how we've dealt with the dangers of childbirth historically.
Erin Allmann Updyke	Yeah.

Erin Welsh	There's no disputing that labor and delivery can be extremely dangerous for both mother and baby, even with all of our modern medical advancements and technologies. Is that how it's always been? That's a really difficult question to answer it turns out.
Erin Allmann Updyke	I have thought about this so, so, so much for so many years now.
Erin Welsh	Yeah. I know.
Erin Allmann Updyke	That I wish that we could know.
Erin Welsh	We can know some things.
Erin Allmann Updyke	Okay, tell me.
Erin Welsh	Yeah. So the historical data on this subject are limited to say the least and they're complicated by several factors, including the effect that medicine has had on maternal and neonatal mortality which has not been always in a positive direction.
Erin Allmann Updyke	Right.
Erin Welsh	For instance, in the 19th century as more male physicians attended childbirth after receiving little if any education in obstetrics, as people moved to crowded cities, as more women gave birth in hospitals, infectious disease became a leading driver of maternal and perinatal mortality.
Erin Allmann Updyke	Right. And we talk a lot about that in our episode on-
Erin Welsh	Semmelweis and puerperal fever.
Erin Allmann Updyke	Semmelweis. Yeah.
Erin Welsh	Yeah.
Erin Allmann Updyke	I was like which episode was that? Because I know we covered it in detail.
Erin Welsh	It was a long time ago, yeah.
Erin Allmann Updyke	Yeah.
Erin Welsh	But the specter of infectious disease during childbirth may be a more recent development, relatively speaking. Some researchers have suggested that early in our evolutionary history, birth might not have been as dangerous but following the agricultural revolution around 20,000 years ago, there was more overnutrition and then that could lead to babies with heads and bodies straining the limits of the birth canal.
Erin Allmann Updyke	Interesting.
Erin Welsh	Yeah.
Erin Allmann Updyke	So it used to just be that if we were limited by nutrition, then you're... Huh.

Erin Welsh	I mean maybe.
Erin Allmann Updyke	Maybe.
Erin Welsh	Maybe.
Erin Allmann Updyke	Who knows?
Erin Welsh	Who knows? Yeah.
Erin Allmann Updyke	Okay, okay.
Erin Welsh	The industrial revolution in the 18th and 19th centuries may have contributed to difficult childbirth in other ways.
Erin Allmann Updyke	Okay.
Erin Welsh	For instance, rickets caused by vitamin D deficiency. See our vitamin D episode. But rickets can often lead to skeletal changes that decreased pelvis size and made it even more challenging for a baby to go through birth canal.
Erin Allmann Updyke	Okay.
Erin Welsh	The WHO today roughly estimates that 5% of births with labor starting spontaneously develop complications.
Erin Allmann Updyke	Okay.
Erin Welsh	5%.
Erin Allmann Updyke	5%.
Erin Welsh	Birth records from a late 18th century midwife, Martha Ballard, the book 'The Diary of a Midwife' that's based on her story is incredible, suggested that 5.6% of births that she attended were difficult.
Erin Allmann Updyke	Interesting.
Erin Welsh	That 5% number for difficult labor or delivery pops up elsewhere throughout the 18th and 19th centuries until medical intervention increased, at which point then difficult increased as well.
Erin Allmann Updyke	Okay.
Erin Welsh	And it's not clear what that 5% complications rate means for maternal or neonatal mortality historically.
Erin Allmann Updyke	Right. And how is difficult defined? Yeah.

Erin Welsh	Right, exactly. Requiring intervention? Then what is requiring intervention?
Erin Allmann Updyke	Right.
Erin Welsh	How do we make those decisions? Yeah.
Erin Allmann Updyke	Okay.
Erin Welsh	Yeah. But those historic numbers and often the ones today, these estimates don't necessarily capture postnatal issues such as like prolapsed uterus or fistulas, something like that which can be long term permanent changes that affect your morbidity over time.
Erin Allmann Updyke	Right.
Erin Welsh	But what strikes me is how different that 5% number is compared to the C-section rate which here in the US is around 33%. High, not the highest. Brazil holds that title with 54% of births done by cesarean.
Erin Allmann Updyke	Wow.
Erin Welsh	Private hospitals have an 84% C-section rate in Brazil. 84%.
Erin Allmann Updyke	84%?
Erin Welsh	Yeah.
Erin Allmann Updyke	Wow.
Erin Welsh	Yeah.
Erin Allmann Updyke	Okay. Keep going.
Erin Welsh	Okay. Complications encompasses a wide range of things but C-sections are one of the most common medical interventions for complications that arise during labor and delivery. How did this procedure go from being a rarity to one of the most performed surgeries in the US and around the world?
Erin Allmann Updyke	Like period.
Erin Welsh	Period.
Erin Allmann Updyke	And that is of all surgeries.
Erin Welsh	Right, including like tonsillectomies, appendectomies.
Erin Allmann Updyke	Knee replacements.
Erin Welsh	Right. How has our attitude towards C-sections changed during that time from when it was like a rare thing to commonplace?

Erin Allmann Updyke	Super common.
Erin Welsh	Are we doing more C-sections than we should be doing? How do we know the answer to that?
Erin Allmann Updyke	How do you know? Yeah.
Erin Welsh	And so today I want to take us through the history of C-sections to try to answer some of these questions. And I know that C-sections are not a universal experience and by talking about C-sections, I am skipping over other important aspects of labor and delivery.
Erin Allmann Updyke	I'll get there.
Erin Welsh	But I think, yeah, you'll get there. Perfect. And I think they're an extremely important topic given how common they are, how much rhetoric there is surrounding C-sections-
Erin Allmann Updyke	Yeah.
Erin Welsh	And I think that going through their history can give us some insight into how medicine has treated pregnant women and viewed risk over time.
Erin Allmann Updyke	Okay.
Erin Welsh	What risk means, what it looks like.
Erin Allmann Updyke	Yeah.
Erin Welsh	This is a nuanced topic with so much amazing scholarship out there and so I just want to shout out a couple of sources at the beginning so that you know that there's so much more opportunity to learn more.
Erin Allmann Updyke	Yeah.
Erin Welsh	So one book is called 'Cesarean Section: An American History of Risk, Technology, and Consequence', that's by Jacqueline Wolf. And another is called 'Invisible Labor: The Untold Story of the Cesarean Section' by Rachel Somerstein.
Erin Allmann Updyke	Okay.
Erin Welsh	All right, are we ready to talk about C-sections?
Erin Allmann Updyke	I am literally so excited.
Erin Welsh	Okay. Well I want to start off by describing what happens during a C-section step by step.
Erin Allmann Updyke	Wonderful.
Erin Welsh	So I'm quoting directly from Rachel Somerstein's 'Invisible Labor' here because I thought it was just a phenomenal description and I was like perfect, great.

Erin Allmann Updyke	Every med student listening that's about to start their OBGYN rotation is thrilled. Thank you.
Erin Welsh	Here we go. Quote: "An anesthesiologist or nurse anesthetist uses spinal anesthesia or an epidural to anesthetize a mother regionally. Then the surgeon uses a scalpel to cut open the abdomen above the mons pubis, slicing through layers of skin and fat and the fascia that covers the abdominal muscles. The physician parts but does not cut the rectus abdominis muscles, six pack, with her hands. Then she cuts through the peritoneum, the layer of tissue that contains organs in the abdomen as if in a tightly sealed bag. She moves the bladder aside to reach the uterus, making yet another incision to open it. She presses on the uterus to push out the baby, which is the source of the pressure C-section moms are told they might experience during the operation. Once the baby is born, the surgeon removes the uterus from the patient's body, sometimes lifting it out completely like a bowling ball to sew it closed. Then she sutures the other layers of the patient's abdominal wall and finally closes the topmost layer." End quote.
Erin Allmann Updyke	Yep.
Erin Welsh	Yeah.
Erin Allmann Updyke	Wholly accurate.
Erin Welsh	But like it's amazing how you just think, like I feel like most people don't know the step by step.
Erin Allmann Updyke	No! Of course not.
Erin Welsh	Which is what's being cut in what order, how do you get the placenta out, like all these different things.
Erin Allmann Updyke	Yeah, yeah, yeah.
Erin Welsh	Yeah.
Erin Allmann Updyke	It's also an incredible thing to get to watch.
Erin Welsh	Yeah.
Erin Allmann Updyke	And experience and be a part of.
Erin Welsh	Yeah.
Erin Allmann Updyke	Like it is really, really fascinating and interesting and incredible.
Erin Welsh	It's amazing. And so this is the way that most C-sections are done today.
Erin Allmann Updyke	Most.
Erin Welsh	But this is not how they've always been done.
Erin Allmann Updyke	Okay.
Erin Welsh	The earliest record of C-sections that we have dates back over 2000 years.

Erin Allmann Updyke	Okay. Wow!
Erin Welsh	Yeah.
Erin Allmann Updyke	I feel like those were not good ones.
Erin Welsh	Well the intention of C-section has changed a lot over time.
Erin Allmann Updyke	Okay.
Erin Welsh	So it's clear that from these early and then subsequent ancient descriptions that this procedure was done very rarely and only when the mother had died or was thought beyond saving.
Erin Allmann Updyke	Okay.
Erin Welsh	And so it was mostly like a last ditch effort to save the baby or baptize the baby before it died.
Erin Allmann Updyke	Okay.
Erin Welsh	Or as a crucial step to prepare the bodies for burial. So mother and baby were often buried separately and so that was sort of part of the steps.
Erin Allmann Updyke	Okay.
Erin Welsh	Those babies that did survive were often viewed as gods, as heroes, or as extremely blessed, which is behind the common misconception of where the Caesarean got its name.
Erin Allmann Updyke	Because it's not Julius Caesar.
Erin Welsh	Not Julius Caesar, yeah.
Erin Allmann Updyke	Yeah.
Erin Welsh	So a lot of stories go, oh the Caesarean got its name from Julius Caesar, the Roman emperor who was born via C-section. Not true as far as we understand. Most scholars think that the name actually comes from a royal law from Ancient Rome that decreed that the body of a pregnant woman could not be buried until the fetus had been removed and buried separately.
Erin Allmann Updyke	Oh okay.
Erin Welsh	Up until the 19th century really, cesareans remained exceedingly rare, only performed in extreme instances and the mother's life took precedence over the baby's. Shockingly there are cases where both mother and baby survived, the first being either in Prague in the 1300s or Switzerland in the 1500s.
Erin Allmann Updyke	Wow.
Erin Welsh	I know.

Erin Allmann Updyke	Wow.
Erin Welsh	I know.
Erin Allmann Updyke	Okay.
Erin Welsh	But overall that outcome was very, very rare.
Erin Allmann Updyke	Very rare.
Erin Welsh	Mostly a cesarean was viewed as a success if the mother survived.
Erin Allmann Updyke	Okay.
Erin Welsh	Regardless of the baby's status.
Erin Allmann Updyke	Okay.
Erin Welsh	This would remain the case well into the 20th century.
Erin Allmann Updyke	Okay.
Erin Welsh	An important exception to this is in the case of enslaved Black women. Often the physician would consult the enslaver to see whether they wanted to preserve the life of the mother or the baby's.
Erin Allmann Updyke	Okay.
Erin Welsh	Anyone surviving a C-section was still so notable that it often made the history books. Such as the case of Alice O'Neill, an Irish woman who had labored for 12 days until her midwife Mary Donnelly by her side, this was 1738, and then Mary her midwife was like the only way to save Alice, Alice's baby had died during this long labor already, was to do a C-section. And so Mary performed the C-section and Alice made a full recovery. In England, the first C-section where a mother survived took place in 1793 and in the US the year after, although this is somewhat disputed. In the US case there was a woman named Elizabeth Bennett which is also you're thinking 'Pride and Prejudice'.
Erin Allmann Updyke	Okay. That's what it was.
Erin Welsh	Yeah. This is before 'Pride and Prejudice' came out.
Erin Allmann Updyke	Okay.
Erin Welsh	Which is, yeah-
Erin Allmann Updyke	Interesting.

Erin Welsh	I mean I don't think it's probably that uncommon of a name. But Elizabeth was going through a difficult labor at her log cabin home and her husband who was a doctor had called another doctor over to help. But this other doctor threw Hands up after an attempted forceps delivery didn't work. And so Elizabeth's husband took matters into his own hands, made an incision, pulled out baby and placenta, allegedly took out the ovaries while he was there to be like I'm making sure this doesn't happen again, and stitched her back up.
Erin Allmann Updyke	Wow.
Erin Welsh	Mom and baby made a fast recovery.
Erin Allmann Updyke	Wow.
Erin Welsh	Allegedly.
Erin Allmann Updyke	Allegedly.
Erin Welsh	Yeah. It's a little embellished like the telling of it.
Erin Allmann Updyke	Yeah.
Erin Welsh	So who knows if it's true.
Erin Allmann Updyke	Okay.
Erin Welsh	Up until the 19th century really, cesareans remained exceedingly rare, only performed in extreme instances and the mother's life took precedence over the baby's. Shockingly there are cases where both mother and baby survived, the first being either in Prague in the 1300s or Switzerland in the 1500s.
Erin Allmann Updyke	Oh interesting.
Erin Welsh	Yeah, yeah. So the story of cesareans is in part just a reflection of whose work was deemed worthy of being included in medical journals and texts historically.
Erin Allmann Updyke	Okay.
Erin Welsh	As incomplete as that story is, it's what we've got. And so now let's turn to the beginning of the modern era of cesareans.
Erin Allmann Updyke	Let's.
Erin Welsh	Okay. Death from infection, a lack of anesthesia, and no consensus on surgical procedure, when to do a cesarean, where to cut, should we take the placenta out, and so on. These things, I know I'm starting off grim but realistic, yeah.
Erin Allmann Updyke	It's dark. Yeah.
Erin Welsh	Yep. These things kept cesarean numbers low for most of the 20th century.

Erin Allmann Updyke	Okay.
Erin Welsh	Between 1838-1878, 89 C-sections were performed in the US.
Erin Allmann Updyke	Okay.
Erin Welsh	62% of mothers died. 60% of babies died.
Erin Allmann Updyke	Okay.
Erin Welsh	One obstetrician from this era said, "There is nothing in surgery about which the surgeon is so timid as a cesarean operation and nothing in obstetrics of which this obstetrician stands so much in dread." Yeah.
Erin Allmann Updyke	Okay.
Erin Welsh	For the sentiment to change going into the 20th century, four developments needed to take place. Anesthesia, antisepsis, blood transfusions, and surgical technique.
Erin Allmann Updyke	Okay.
Erin Welsh	Practicing primarily on women of color, poor women, disabled women, other women viewed as second class citizens, surgeons honed their approach to cesareans. Eduardo Poro introduced the Poro technique in 1878, which involved amputating the uterus at the cervix and suturing the cervix into the abdominal wall.
Erin Allmann Updyke	Whoa.
Erin Welsh	Yeah. This actually did reduce infection and hemorrhage, brought the survival rate up to 44%.
Erin Allmann Updyke	Okay.
Erin Welsh	Max Sänger used silver wire in uterine sutures beginning in the late 1880s, further improving survival rate. I think previously they were like should we even suture the uterus back together?
Erin Allmann Updyke	Oh gosh, okay.
Erin Welsh	Because well infection was so bad.
Erin Allmann Updyke	Infection. Okay, okay.
Erin Welsh	Yeah. By the 1910s the overall maternal mortality rate for cesareans dropped to 8.1%.
Erin Allmann Updyke	Wow.
Erin Welsh	Which is lower than the 56% it was in the late 1800s but still very high for a surgery, so its use was debated.
Erin Allmann Updyke	Okay.

Erin Welsh	With the decision to cut often influenced by the social standing of the mother, which opened the door to eugenics, right. So the risk of a negative outcome was perceived to be lower in cases where you didn't care whether or not mother and baby lived.
Erin Allmann Updyke	Oh my god. Okay.
Erin Welsh	Yeah. Inductions were often used as a way to prevent what was seen as an extremely risky procedure. But over the first they were like well we want to avoid a cesarean, so we'll just induce you. So that became very, very popular. But over the first 7 decades of the 20th century, that perception of risk would change. What started out as a surgery to be avoided at all costs turned into something that you only did in extreme circumstances, then something to do in certain situations, and then only at the discretion of the physician, to finally something that was routine. The reasons for this shift included those I mentioned earlier, transfusions, antisepsis, anesthesia, technique, plus antibiotics introduced in the 1940s-
Erin Allmann Updyke	Okay.
Erin Welsh	And a gradual decline in maternal mortality from other causes. So as obstetricians got better at recognizing and treating or preventing complications for mom during pregnancy and childbirth, the focus then shifted to seeing a similar decrease in neonatal and perinatal mortality.
Erin Allmann Updyke	Okay. Because previously it had always been about maternal mortality and trying to reduce that and the baby was always secondary.
Erin Welsh	Yes.
Erin Allmann Updyke	And then as we got better at reducing maternal mortality, now we said okay, can we save these babies?
Erin Welsh	Yes, exactly.
Erin Allmann Updyke	Got it.
Erin Welsh	Yep, yep. And so then we started to develop things like diagnostic tools, the Apgar score, the Friedman curve to measure how labor is progressing-
Erin Allmann Updyke	Yeah.
Erin Welsh	X-rays, ultrasound, and the electronic fetal monitor.
Erin Allmann Updyke	Yeah.
Erin Welsh	Which was introduced in the 1950s or a lot of these were established by the 1950s and 1960s.
Erin Allmann Updyke	Okay.

Erin Welsh	Obviously X-rays were a long time previous to that. But these different diagnostic tools captured what seemed like more and more risk during childbirth and thus more and more reason to do a C-section. Or placental issues, pelvis size, estimated baby size, uterine rupture, preeclampsia, etc. We got better at detecting those and measuring those and being like well we should-
Erin Allmann Updyke	Right.
Erin Welsh	How do we prevent that?
Erin Allmann Updyke	We can see the risk, so how can we not do something about it?
Erin Welsh	Yes, exactly.
Erin Allmann Updyke	That's what it is.
Erin Welsh	Exactly.
Erin Allmann Updyke	Yeah, okay.
Erin Welsh	But in another way, what these instruments were doing in part was confirming what early male physicians involved in childbirth believed, that pregnancy and childbirth were pathological processes in themselves.
Erin Allmann Updyke	Ooh Erin.
Erin Welsh	I know.
Erin Allmann Updyke	Okay.
Erin Welsh	Yep. By the 1970s the tides had fully turned and C-sections were about to skyrocket, at least here in the US. To give you some idea of this massive change, let me throw some numbers at you.
Erin Allmann Updyke	Please.
Erin Welsh	Until 1970, the US C-section rate was 5.5%.
Erin Allmann Updyke	Wow, okay.
Erin Welsh	Between 1965-1987, the rate of C-sections grew 455%.
Erin Allmann Updyke	I'm sorry, that is such a short...
Erin Welsh	Yeah.
Erin Allmann Updyke	I think what I didn't realize about looking at these numbers is how short that time frame was when it just boomed.

Erin Welsh	Yeah. Electronic fetal monitoring was a big.
Erin Allmann Updyke	Okay.
Erin Welsh	Yeah, yeah.
Erin Allmann Updyke	Oh that's really interesting especially in the context of like today.
Erin Welsh	Yep.
Erin Allmann Updyke	Okay, interesting.
Erin Welsh	Yeah. And it became, it just... There are so many different dynamics to this as well. Yeah, so in 1965 the rate was like 4.5% and 1987 it was 25%.
Erin Allmann Updyke	Wow.
Erin Welsh	Which is also lower than it is today.
Erin Allmann Updyke	Yeah.
Erin Welsh	Articles or stories that referenced C-sections in the 1960s still included a definition of the procedure.
Erin Allmann Updyke	Wow.
Erin Welsh	Yeah.
Erin Allmann Updyke	Okay.
Erin Welsh	And those published after 1970 didn't have to.
Erin Allmann Updyke	Didn't need to.
Erin Welsh	And the shift wasn't entirely welcomed by all obstetricians.
Erin Allmann Updyke	Okay.
Erin Welsh	Many of whom saw cesareans as requiring much less skill than assisting in vaginal birth-
Erin Allmann Updyke	Interesting.
Erin Welsh	And were against expanding criteria for the procedure because they were afraid of their own marginalization in part.
Erin Allmann Updyke	Interesting.
Erin Welsh	The skills that had taken them years to learn and perfect would be pointless with a surgical technique that took a few weeks to learn.

Erin Allmann Updyke	Interesting.
Erin Welsh	Yeah. And this is not unfounded, right? Few physicians today have ever attended a vaginal breech birth and watching a monitor is no substitute for interacting with a patient and becoming familiar with the varied rhythms of labor and that patient themselves, like the person who they are.
Erin Allmann Updyke	Yeah.
Erin Welsh	The natural birth movement beginning in the 1970s was in part a reaction to the increasing medicalization of pregnancy and childbirth which included C-sections. And this combined with the push for vaginal birth after C-section, VBAC, in the 1980s led to a brief dip in C-section rates in the US.
Erin Allmann Updyke	Okay, okay.
Erin Welsh	But that decline was short-lived as resistance to VBACs grew among doctors, as insurance companies hiked up malpractice insurance rates for doctors who performed VBACs-
Erin Allmann Updyke	Oh gosh.
Erin Welsh	And as hospitals just began to forbade it as an option. Yeah.
Erin Allmann Updyke	Wow. Hospital administration making decisions. Cool, cool, cool, cool, cool, cool, cool, cool, cool. Insurance. Yep, love it. United States! Sorry.
Erin Welsh	I mean I do think this is probably like a global issue as well to some degree, yeah.
Erin Allmann Updyke	I know, obviously yeah. Based on the stats.
Erin Welsh	But these are US numbers, for sure, yeah.
Erin Allmann Updyke	Yeah.
Erin Welsh	The once a cesarean, always a cesarean adage that was first popularized by Edwin Cragin in 1916 still holds sway.
Erin Allmann Updyke	1916?
Erin Welsh	1916, yeah.
Erin Allmann Updyke	Okay.
Erin Welsh	The perception of risk had shifted. Before the 1970s, C-sections themselves were seen as the risk and after, not performing the procedure was the risk.
Erin Allmann Updyke	Okay.
Erin Welsh	Medical malpractice suits on failure to perform a C-section reinforced this.

Erin Allmann Updyke	Okay.
Erin Welsh	But what seems to have gotten lost as cesareans became more normalized is that the procedure does carry with it substantial risks which can be compounded in subsequent C-sections. I know you'll talk a little bit more about this, Erin, but high rates of blood transfusions, emergency hysterectomies, postpartum depression, difficulty breastfeeding, newborn lung conditions, and in subsequent pregnancies, stillbirth, uterine ruptures, placental anomalies such as placenta accreta. We can see the impact of C-sections on placenta accreta by looking at rates over time.
Erin Allmann Updyke	Yeah.
Erin Welsh	From the 1930s to the 1950s, placenta accreta occurred in less than 1 in 30,000 births.
Erin Allmann Updyke	Oh my gosh.
Erin Welsh	By 2016 that number was down to 1 in 272.
Erin Allmann Updyke	Yeah.
Erin Welsh	In large part due to C-sections.
Erin Allmann Updyke	Right. Placenta accreta is when the placenta grows too deeply into the myometrium. In some cases it can actually go all the way through the myometrium and be adherent to the outside wall or even into the abdominal cavity.
Erin Welsh	Yeah.
Erin Allmann Updyke	It's a spectrum of disorders depending on how deep it is. And if it can be identified prior to delivery, then generally a cesarean section is necessary to be able to ensure that you can remove all of the placental tissue because as we'll talk about it's really important that the whole placenta comes out. But sometimes it's not identified and so then it can result in increased risk of hemorrhage and things like that.
Erin Welsh	Yeah. And from my understanding is that risk of placenta accreta increases with every C-section-
Erin Allmann Updyke	With every C-section.
Erin Welsh	Because of the potential for just the lack of like decidua that can form where the previous scar is.
Erin Allmann Updyke	Exactly, exactly. Because of the cesarean scar.
Erin Welsh	Yeah, yeah.
Erin Allmann Updyke	Yeah.

Erin Welsh	Okay. Now that we've like talked about some of the negative things, I do want to just emphasize that C-sections are absolutely a life saving procedure.
Erin Allmann Updyke	They really are.
Erin Welsh	And they are incredibly safe.
Erin Allmann Updyke	Yeah.
Erin Welsh	I don't want to give the impression that they aren't.
Erin Allmann Updyke	Right.
Erin Welsh	That's not the point I'm trying to make. The point is that while there are risks inherent in this procedure, risks that are worth it if it means a healthy mother and baby, these risks aren't always adequately communicated, whether in planned cesarean sections, unplanned ones, or in many what to expect while you're expecting books. The decision to conduct an unplanned cesarean isn't always explained to the person in labor who in their state of anxiety, pain, worry, doesn't feel like they can ask questions or be listened to.
Erin Allmann Updyke	Or can't understand like everything that's happening all at once because it can change on a dime.
Erin Welsh	Right. Exactly, yeah.
Erin Allmann Updyke	Yeah.
Erin Welsh	Being in a room surrounded by people for whom this is an everyday occurrence seems like it should be reassuring but what it can often be is silencing and isolating.
Erin Allmann Updyke	Yeah.
Erin Welsh	Your fears are dismissed because oh it's fine, we do this all the time, don't worry about it. Your questions aren't answered because the doctor is telling you there's no time, we have to do this now. And this crowded labor room filled with capable hands provides no comfort because most of them are strangers. They don't know you, you don't know them. This feeling of a loss of control might not be unique to C-sections but it is something that gets minimized both during and after childbirth, both of which carry significant rates of emotional trauma. One study I saw reported 45%. The message is well you've got a healthy baby, what do you have to complain about? Get over it, like just enjoy your baby.
Erin Allmann Updyke	Yeah. Also they're screaming all the time, so it's hard to enjoy.
Erin Welsh	Enjoy. But this no big deal sentiment carries over into the physical trauma of C-sections which are treated like the world's most minor surgery instead of the major abdominal surgery that they are.
Erin Allmann Updyke	I do find that so interesting.
Erin Welsh	Yeah, it's like oh cesarean, oh my god, that must be nice for you, right.

Erin Allmann Updyke	Right. Yeah.
Erin Welsh	It's like what? Like how are you expected to carry your newborn to their first doctor's appointment when you aren't supposed to lift anything because your muscles have just undergone significant trauma?
Erin Allmann Updyke	Right. Yeah. And even if your newborn is only like 6 or 7 pounds, your car seat is 12.
Erin Welsh	Yeah, exactly!
Erin Allmann Updyke	And so now you're at your 20 pound max.
Erin Welsh	Right. Great. And then how long? How long does that... In the famous pregnancy book 'What to Expect While You're Expecting', you know this book, everyone knows this book.
Erin Allmann Updyke	I do, I've never read it though.
Erin Welsh	Yeah, I haven't either. But I did come across this description of C-sections in one edition. "Instead of huffing, puffing, and pushing your baby into the world, you'll get to lie back and let everyone else do the heavy lifting."
Erin Allmann Updyke	I hope that was... I don't even know what I hope about that description because I...
Erin Welsh	I know, I know.
Erin Allmann Updyke	Oh gosh.
Erin Welsh	My charitable take is that maybe it was meant to be reassuring.
Erin Allmann Updyke	Reassuring. Sure, sure, sure.
Erin Welsh	And like don't worry about it, this is something that you don't have to stress about this major surgery.
Erin Allmann Updyke	It's not helpful for either side because it makes it seem like a vaginal birth is like the worst possible thing and it's so hard.
Erin Welsh	Right. Yeah.
Erin Allmann Updyke	And then it makes it seem like a cesarean section is so easy and like neither one of those things are exactly true.
Erin Welsh	Yeah.
Erin Allmann Updyke	It's all still childbirth.
Erin Welsh	It's all childbirth.
Erin Allmann Updyke	Yeah.

Erin Welsh	Yeah. And the thing is too, I also want to acknowledge that that might be someone's experience.
Erin Allmann Updyke	Right, yes.
Erin Welsh	Like that maybe I don't want to say like everyone who has C-sections has a horrible time because maybe they didn't.
Erin Allmann Updyke	Right. Yeah.
Erin Welsh	Maybe it was like this is totally fine.
Erin Allmann Updyke	Maybe it is a scheduled procedure and it goes exactly as planned and it was very relaxing and your recovery is easy and that's phenomenal.
Erin Welsh	Right. Or even if it was unplanned and it's like-
Erin Allmann Updyke	Right.
Erin Welsh	Yeah.
Erin Allmann Updyke	But the same can also be true for a vaginal delivery.
Erin Welsh	For sure, yeah, yeah. But I feel like yeah, this saying it that way, describing it that way is so dismissive.
Erin Allmann Updyke	Right. It's one way that it will go.
Erin Welsh	Yes.
Erin Allmann Updyke	Yep.
Erin Welsh	And it also sort of is like well if you felt any other way, then that's on you, right.
Erin Allmann Updyke	Right.
Erin Welsh	And this perception of C-sections as being either like the easy way out or a vanity procedure which we'll get into that, yeah, or not real birth is so incredibly harmful. And I feel like this idea of natural birth or the term 'natural birth' implies unnatural birth.
Erin Allmann Updyke	Right.
Erin Welsh	And that can be so othering, right? That along with a million different books and articles and forums saying you should do this and you shouldn't do that. If you do this, you're a good mother. If you don't do this, then you're a bad mother. Like that sort of thing.
Erin Allmann Updyke	I know, right. It compares and contrasts in this way.

Erin Welsh	Right. The focus on skin to skin bonding in the minutes right after birth. What happens if you're under anesthesia or if baby is rushed away for extra care? That's okay. Everything will be okay. But that message gets lost. Women who have C-sections often have a more difficult time breastfeeding which can then lead to shaming because that's not the way you're supposed to do it. When in reality a fed baby is the best baby. The moral superiority tied to so much of pregnancy and childbirth can be crushing and isolating, especially when things are out of your control. Even the language that we use to describe reasons for C-sections shows this.
Erin Allmann Updyke	Oh my gosh, I talk about this too.
Erin Welsh	Failure to progress, incompetent cervix, inefficient contractions, uterine dysfunction. Some women are told you're not trying hard enough. I know. You're not strong enough. Yes. Like you're not even pushing, what are you doing? Do you want to have a C-section? Yeah.
Erin Allmann Updyke	Oh my god, I can't.
Erin Welsh	Sorry.
Erin Allmann Updyke	It's too...
Erin Welsh	I know, I know.
Erin Allmann Updyke	Yeah.
Erin Welsh	But that all places the blame on them, making the C-section solely their decision rather than what the doctor instructed. And it's so difficult to know, like you have this plan, you want your birth to go a certain way and then something goes not according to plan.
Erin Allmann Updyke	Right.
Erin Welsh	What do you do? Do you feel like it's your fault? It's really complicated.
Erin Allmann Updyke	And I mean that is the truth of our entire lives, right?
Erin Welsh	Yeah.
Erin Allmann Updyke	Is like we cannot plan everything. But I do think that especially today there is very much an emphasis on like having a plan. And then when things, if things do not go according to that plan, it makes it seem like you did something wrong.
Erin Welsh	Right.
Erin Allmann Updyke	When that's not reality.
Erin Welsh	It's not reality, yeah.
Erin Allmann Updyke	So it's really hard.

Erin Welsh	Yeah, it is really hard. And I think that what it does is sort of shift the attention away from where I think we need to be more, like have more discussions about what are these drivers for this 33% rate of C-sections at the provider level, at the institutional level, at the systemic level?
Erin Allmann Updyke	Right.
Erin Welsh	One overlooked aspect is the individual provider's reasons for deciding on a C-section. Trauma during childbirth is not exclusive to the mother. And as a provider if you attend a traumatic vaginal birth, you might be more likely to suggest a C-section than your other colleagues.
Erin Allmann Updyke	And every provider has seen traumatic everything.
Erin Welsh	Yeah, yeah.
Erin Allmann Updyke	I mean the things that obstetric providers see on a daily basis are trauma.
Erin Welsh	Exactly, yeah. Some hospitals, I found this fascinating, took to publishing or displaying each physician's cesarean rates and that led to them plummeting.
Erin Allmann Updyke	Interesting. Wow.
Erin Welsh	So which suggests that maybe risk tolerance for vaginal birth is lower than physicians think it should be. And so I don't know what to make of that.
Erin Allmann Updyke	Yeah, that's very interesting.
Erin Welsh	But I do think that is, yeah. And then there's implicit bias. Black mothers are more likely to have C-sections than white mothers even if risk factors are similar. Does this suggest that non-white mothers can't be trusted to give birth without medical intervention? Which is also then funny because it's like but we're also... You have pain? I don't believe you. Yeah. Other research shows that female OBGYNs and maternal fetal medicine specialists are more likely to opt for an elective cesarean for themselves rather than low risk vaginal birth. 21%-31% preferred elective cesarean. So how does that personal preference bleed into their practice? Along with these individual drivers, what about the US medical system as a whole?
Erin Allmann Updyke	Oh my gosh.
Erin Welsh	Driven by profits, fear of litigation. How do these things impact rates? And finally how much of this rise in C-sections is due to a corresponding rise in the actual risk factors for the procedure?
Erin Allmann Updyke	Right.
Erin Welsh	Like older age during pregnancy.
Erin Allmann Updyke	Yep.
Erin Welsh	Or higher rates of preeclampsia in recent decades.
Erin Allmann Updyke	Yeah.

Erin Welsh	How appropriate is a comparison between historical and modern rates of difficult labor?
Erin Allmann Updyke	Yeah.
Erin Welsh	Do these historical metrics capture neonatal or perinatal mortality, injuries during childbirth, disability caused by difficult labor? Let me reiterate again, C-sections are a life saving and generally extremely safe procedure. But in order to reach the WHO's recommended ideal C-section rate of 10%-15%-
Erin Allmann Updyke	15%, yeah.
Erin Welsh	We really need to reassess the metrics that we use to make decisions about interventions. How are we measuring risk? How accurate are these measurements? Are the risk factors themselves increasing? Medical advancements have saved the lives of so many mothers and babies but in our reliance on diagnostic tools and technologies, we've left something else behind. And that is the comfort that community can bring to pregnancy, childbirth, and child rearing. Which is in part what I'll be talking about next week.
Erin Allmann Updyke	I'm excited for that.
Erin Welsh	Next episode. But for now, Erin, I want to turn it over to you to tell me everything about labor and delivery.
Erin Allmann Updyke	I'm not going to tell you everything but I'll cover a lot right after a short break.
Erin Welsh	Yeah.
TPWKY	(transition theme)
Anonymous	It was in March of 2023 that we lost our first baby to miscarriage. We'd been trying to conceive for quite some time and were absolutely ecstatic to become parents but we ended up in the accident and emergency department following some bleeding. I remember getting the news and just completely breaking down. It was a really busy Friday night and we were told that we should go home and come back the next day for a transvaginal ultrasound. When we were in that waiting room, we already knew that we had lost our baby but we were surrounded by excited, happy parents who were waiting to get their own scans and it just felt like such a lonely and isolating experience. Once they had done the scan to confirm that it wasn't an ectopic pregnancy that needed further intervention, we were told we should go home and wait for the fecal matter to pass on its own. It was a really bizarre situation where literally being told to flush your hopes and dreams down a toilet, it felt very cold and clinical.
	I never truly appreciated that so many pregnancies end in miscarriage. I think it's about 1 in 4 is the statistic which is so many people who are affected by baby loss. To further this, I felt like I couldn't really take any time off from work and that I was a failure in some ways, which I know having spoken to other women is something that I'm not alone with. It wasn't just the physical pain of having the miscarriage but the emotional toll that it took on me and my partner as well. Growing up, you're always told that if you have sex, you'll get pregnant and obviously pregnancy equals a baby. But that is so not the case for so many people. Sadly, we were one of the unlucky few couples that go on to have recurrent miscarriages, so that sort of feeling of isolation and loneliness has happened time and time again for us.

	Each time I felt like I should just get over it. There was lots of support when we had that first miscarriage, but after the second one, it sort of starts to dwindle, particularly with people in the workplace. In the UK currently there's no paid time off, no legal right to have paid time off if you lose a baby under 24 weeks of gestation. So I've actually been campaigning to introduce that. I'm really pleased to say that most recently we've managed to do that in my workplace and we're one of the first people within our industry to actually introduce paid time off for bereaved parents who lose a baby for miscarriage or for termination for medical reasons under 24 weeks. And I hope that my story can empower other people to campaign for the same in their workplaces and to feel less alone.
Kate	Hi, my name's Kate from Western Australia and I'm the mother of two preterm babies. After a fairly smooth pregnancy at the age of 28, I gave birth to my son at just 30 weeks and 5 days. He was 1,375 grams or about 3 pounds. Went to hospital after a really bad cramping, backache, and bleeding, and I was advised I was in preterm labor. I was given steroids for his lungs because he was so early, we had to be transferred to the public hospital. And by the time I had been admitted, they rushed me in for an emergency cesarean as they could feel his little feet poking out. I was completely terrified with my teeth chattering uncontrollably from the epidural. Our son was lifted out onto a warming bed and given oxygen. To our relief he cried but I only got a glimpse of him as he was taken to the ICU to be intubated and placed in a humidicrib.
	He then spent a day or so in the ICU on oxygen. He was then put on a CPAP machine and moved to the neonatal ward where I was able to hold him for the first time. I remember the nurse tucking him under my singlet for the skin to skin which was such a surreal and amazing moment for me. So many ups and downs. Jimmy was discharged from hospital after 9 long weeks but he is now about to turn 15 years old. 2.5 years later, his sister was born. When I was 32 weeks and 5 days, I had the same cramping, the same backache. But I got to hospital much earlier this time. I was given steroids, they tried to slow everything down, which they did for a few hours. But she was also determined to make an early entrance. As she was head down and quite small in size, we decided I was safe to deliver vaginally.
	Evie was born at 1,875 grams which is about 4 pounds. She was breathing on her own, and I was able to hold her almost straight after. The extra time and the pressure from the vaginal birth ensured that steroids worked on her lungs which made such a huge difference. Our Evie came home with us just 4 weeks later. Having to leave your new baby to go home every day is so incredibly hard. So thank you so much to the nurses at King Edward Memorial. You made it bearable and you're all so kind and so caring. Thank you.
TPWKY	(transition theme)
Erin Allmann Updyke	So by the end of the last episode, episode 2, by the end of my section, I made it like most of the way through pregnancy and I stopped just before the big event, delivery.
Erin Welsh	Yup.
Erin Allmann Updyke	And of course, Erin, you beautifully walked us through some parts of delivery, especially C-sections and how those go. But I'm going to focus a little bit on what most people, because even at 33%, most people, a lot of people even in that 33% of cesarean sections go through some part of labor beforehand.
Erin Welsh	Yep.
Erin Allmann Updyke	So what the heck is that?

Erin Welsh	What is that? What is labor?
Erin Allmann Updyke	I can't wait to tell you. So I'm going to go through what we know about the biology of labor and then walk through delivery modes, methods, a little bit more on C-sections and vaginal deliveries. It's going to be great. So what is labor?
Erin Welsh	Yeah.
Erin Allmann Updyke	Okay. During our whole pregnancy all of the hormones jutting around that we've talked about, progesterone, prostaglandins, blah, blah, blah, all these things, what they do is help to keep our uterus relatively quiescent, relatively relaxed.
Erin Welsh	Okay.
Erin Allmann Updyke	Often, especially late in pregnancy, we might see this irregular contractility. So anyone who has experienced what they call Braxton Hicks contractions knows what those are. It's basically just your uterus... Sometimes people describe it as getting ready for birth. I don't know that that's accurate but it's just your uterus every once in a while is still going to have these contractions.
Erin Welsh	Just what is a contraction? Yeah.
Erin Allmann Updyke	It is actually because your uterus has like the inner lining, right, the endometrium but then it's a huge muscle.
Erin Welsh	Yeah.
Erin Allmann Updyke	And so it is the muscle fibers contracting literally.
Erin Welsh	Okay.
Erin Allmann Updyke	Like your biceps contracts.
Erin Welsh	But I mean how long does it contract? I know it's variable.
Erin Allmann Updyke	Oh Erin, we're gonna get there.
Erin Welsh	No, no, we'll get there. But Braxton Hicks.
Erin Allmann Updyke	Braxton Hicks contractions are defined as, okay, so to kind of define that we have to define what do we mean by labor?
Erin Welsh	Yes.
Erin Allmann Updyke	Like how are you defining those contractions and what's the difference there? And that is what they are doing. So the onset of labor is defined as when there is a switch in the contractions to where they are resulting in dilation and effacement of the cervix.
Erin Welsh	Okay.

Erin Allmann Updyke	So contractions that are happening where you're having perhaps pain, sometimes they're painful, where your uterus is contracting but there's no change in your cervix-
Erin Welsh	Okay.
Erin Allmann Updyke	Those contractions are not considered labor contractions.
Erin Welsh	Got it.
Erin Allmann Updyke	So what we see with the onset of labor is that these contractions increase in frequency and intensity and they become regular. Which means that they're occurring at regular intervals. What that interval is is going to vary, right? Later on in labor they're much closer together, maybe a minute or two.
Erin Welsh	Yeah.
Erin Allmann Updyke	But at the start they could be like 10, 15, even 20 minutes apart.
Erin Welsh	Yeah.
Erin Allmann Updyke	If they are causing cervical change then they are considered labor contractions.
Erin Welsh	Okay. Did you say like which hormones are causing this yet? Sorry.
Erin Allmann Updyke	Did I say what triggers labor? No, I did not, Erin.
Erin Welsh	Okay.
Erin Allmann Updyke	Because we don't know.
Erin Welsh	What?
Erin Allmann Updyke	We don't know.
Erin Welsh	That can't be right. Check your notes again.
Erin Allmann Updyke	We don't know. I said what triggers labor to begin? What an excellent question. It is hypothesized, we think, that labor, the onset of labor is triggered by the fetus or the placenta, the fetal placental unit.
Erin Welsh	Yeah.
Erin Allmann Updyke	We think that because that is what happens in sheep and cows. And in those other animals, we know what enzymes are involved, we know the specific hormonal triggers. But we do not know that in humans. And if we did, it would be so much easier to induce labor.
Erin Welsh	Also sheep and cows have less invasive placentas as we both know.
Erin Allmann Updyke	Okay, I know. So it's different and that's why it's not the same in us.

Erin Welsh	Yeah, yeah, yeah. But I mean we have animal models that we understand the step by step process of labor.
Erin Allmann Updyke	That we understand the trigger.
Erin Welsh	The trigger.
Erin Allmann Updyke	And so in us, we don't have that trigger. We know that a really important thing is that oxytocin-
Erin Welsh	Yep.
Erin Allmann Updyke	Which is a hormone, that the synthetic version of it is called Pitocin-
Erin Welsh	Yeah.
Erin Allmann Updyke	That triggers uterine contractions. But what triggers, in someone who spontaneously goes into labor, what triggers that? Because it's not just like just oxytocin, something else has to trigger the production of that.
Erin Welsh	Yeah, yeah, something has to come before.
Erin Allmann Updyke	Yeah. We don't know what that is.
Erin Welsh	Okay. And then for the regularity of these contractions, is it just the speed at which oxytocin is being released? What is-?
Erin Allmann Updyke	Don't know.
Erin Welsh	Okay. So we don't know why. I mean we know why they speed up, like the purpose of speeding up.
Erin Allmann Updyke	Right. We know what they're doing.
Erin Welsh	Yeah.
Erin Allmann Updyke	But we do not know very much about the physiology of what is triggering it. But we do know a lot about how labor progresses.
Erin Welsh	Okay.
Erin Allmann Updyke	So what I'm going to go through are the different stages of labor. There are three. The first stage has two different phases, so we'll talk about all of that. And to do that, I did bring some props.
Erin Welsh	Yay!
Erin Allmann Updyke	This is a balloon.

Erin Welsh	Is there something in there?
Erin Allmann Updyke	Don't worry, we'll get there.
Erin Welsh	Oh my god.
Erin Allmann Updyke	This is a balloon that is going to represent our uterus. So if you're just listening, imagine a balloon. It's inflated, okay, but it's not tied off at the bottom. All right? So this is a uterus and this part down here, like the part that you would blow into of a balloon, is the cervix.
Erin Welsh	Yeah.
Erin Allmann Updyke	During pregnancy...
Erin Welsh	This is the best.
Erin Allmann Updyke	I spent so long, I practiced this at home and everything. My kids helped me. It was great. So this part is the cervix, the part that you would blow into of the balloon. During pregnancy and outside of pregnancy, it's long and it's firm. It kind of feels like the tip of your nose if you were to touch it. Okay?
Erin Welsh	Okay.
Erin Allmann Updyke	And it is closed, so you see that there's no opening here, right?
Erin Welsh	Yeah, what is that?
Erin Allmann Updyke	What is that?
Erin Welsh	No, I mean like but what is that for you?
Erin Allmann Updyke	It is a little puffball.
Erin Welsh	Okay.
Erin Allmann Updyke	Craft puffball.
Erin Welsh	And what is it representing?
Erin Allmann Updyke	It is representing the mucus plug. So during pregnancy your cervix is closed with a mucus plug. And so one of the first steps of labor is that this mucus plug is shed.
Erin Welsh	So exciting.
Erin Allmann Updyke	Thank you. And then through the power of these contractions, these contractions that are regular, that increase in frequency and intensity-
Erin Welsh	I'm so nervous it's going to pop.

Erin Allmann Updyke	It's not going to pop. I've practiced. The cervix has to do two things. It has to dilate and it has to efface.
Erin Welsh	Okay.
Erin Allmann Updyke	So dilation means that it has to go from closed to open. It's not going to pop on you.
Erin Welsh	You're aiming that at me!
Erin Allmann Updyke	And so it has to go from a state of being completely closed to about 10 centimeters open in diameter.
Erin Welsh	Okay.
Erin Allmann Updyke	That is fully dilated.
Erin Welsh	10 centimeters.
Erin Allmann Updyke	But it also, as you can see if I'm squeezing this, it's also getting thinner, right. It's not as deep.
Erin Welsh	Yeah.
Erin Allmann Updyke	That's called effacement. So it has to go from several centimeters, kind of like thick and deep-
Erin Welsh	Yeah, yeah, yeah.
Erin Allmann Updyke	To basically paper thin tissue.
Erin Welsh	Got it. So it's just... Yeah.
Erin Allmann Updyke	Yeah. It's just smoothing out and kind of becoming more of a part of the actual uterus itself.
Erin Welsh	Okay. Smoothing out.
Erin Allmann Updyke	Cool?
Erin Welsh	Cool.
Erin Allmann Updyke	So that happens all through the power of contractions. The first stage of labor, this is all part of the first stage of labor, dilation and effacement, it's divided into two parts. Latent labor and active labor. And these definitions vary a little bit place to place. So just for transparency, I'm using US definitions like from the American College of Obstetrics and Gynecology. They define latent labor as the phase from when the cervix is completely closed until 6 centimeters dilated.
Erin Welsh	Okay.
Erin Allmann Updyke	And we have found through lots of studies on people's labor progression, those labor curves-
Erin Welsh	Yeah.

Erin Allmann Updyke	That 6 centimeters is kind of this magic number where after that point the regularity with which you dilate can be predictable. Up until 6 centimeters, someone might have very, very, very slow change. So they might have a latent phase of labor that is many, many, many hours long.
Erin Welsh	Yeah.
Erin Allmann Updyke	If those contractions are still happening at a regular interval, even if again that interval is like 10, 15, 20 minutes, if they're still having cervical change, albeit slow, that would still be considered labor, just latent. There is estimates on like how long does latent labor last? What is quote unquote "normal"? What is outside of the range of normal? And that is a little bit up in the air.
Erin Welsh	Okay.
Erin Allmann Updyke	Because latent labor can really vary and most of the data that we have is the time between admission to the hospital and the onset of active labor. But that doesn't necessarily mean that your labor started when you entered the hospital.
Erin Welsh	Right.
Erin Allmann Updyke	But that number is about 16 hours.
Erin Welsh	Wow.
Erin Allmann Updyke	Is like the 95th percentile.
Erin Welsh	Yeah.
Erin Allmann Updyke	That's not the average, that's like the long end of things.
Erin Welsh	Oh okay, okay.
Erin Allmann Updyke	Yeah. But again, that's going to depend very much person to person.
Erin Welsh	Yeah.
Erin Allmann Updyke	So latent labor is the time that like really, really can vary. After you get to 6 centimeters, that is when you are now considered to be in active labor. And that is the time at which the cervical change should speed up to a predictable interval of about 1 centimeter every 2 hours.
Erin Welsh	Okay.
Erin Allmann Updyke	Or less, faster is totally fine.
Erin Welsh	Yeah. Sorry, that's at 6 centimeters?
Erin Allmann Updyke	After 6 centimeters, yeah.

Erin Welsh	Okay.
Erin Allmann Updyke	So to go from 6 to 10, you've got like 8 hours.
Erin Welsh	Yeah. Got it.
Erin Allmann Updyke	Before a provider is going to be like this is taking too long.
Erin Welsh	Okay.
Erin Allmann Updyke	Okay?
Erin Welsh	Okay. But 10 is then fully-
Erin Allmann Updyke	10 is fully dilated. Yeah.
Erin Welsh	Okay.
Erin Allmann Updyke	Okay? Questions about any of that?
Erin Welsh	Yeah, so okay. So the active labor part is more predictable.
Erin Allmann Updyke	More predictable.
Erin Welsh	But then not everyone progresses through active labor the same way.
Erin Allmann Updyke	Yeah. Yeah. Well you mean through like that from 6-10 centimeters?
Erin Welsh	Yeah.
Erin Allmann Updyke	Right.
Erin Welsh	In 8 hours or whatever.
Erin Allmann Updyke	Yeah. And so if they don't, a few things might be the case. So one thing that should usually happen at some point prior to that probably is that your water should break. If your water didn't break on its own, then a provider might say we should break it for you.
Erin Welsh	Yeah.
Erin Allmann Updyke	This is a crochet hook that I brought which looks exactly like-
Erin Welsh	It does look exactly like...
Erin Allmann Updyke	An amnio hook. This is the actual hook. You can see it looks exactly identical.
Erin Welsh	It does, yeah.

Erin Allmann Updyke	It's just longer.
Erin Welsh	And not round.
Erin Allmann Updyke	And not round.
Erin Welsh	You wouldn't want to crochet with that.
Erin Allmann Updyke	No, yeah, yeah, yeah. But this is used to break somebody's water. Now the reason that that's important is because the baby's head, which is hopefully down, exerts pressure on that cervix. If there is a bag of fluid there, then that might limit the amount of pressure that's being exerted and might make it so that your cervix is not dilating the way that it should.
Erin Welsh	Right.
Erin Allmann Updyke	So that's the reason that a lot of times if water hasn't broken on its own, that will be an intervention that's recommended to help speed up the process of labor.
Erin Welsh	What determines how much fluid?
Erin Allmann Updyke	I was gonna-
Erin Welsh	Oh yeah, sorry.
Erin Allmann Updyke	I was going to do it but I think it actually might make a mess, so I'm going to stop there. I had a baby in there to deliver.
Erin Welsh	I'm envisioning the water going everywhere.
Erin Allmann Updyke	It would make a mess.
Erin Welsh	Yeah, what determines how much liquid; how much amniotic fluid is in there?
Erin Allmann Updyke	Big question. So the amniotic fluid is pee, it's fetus pee.
Erin Welsh	Yeah.
Erin Allmann Updyke	So it depends on how much the fetus is peeing and whether or not their kidneys are working correctly and also how much they... Because then they drink that pee and so it's like a whole thing, it's fetal development, I'm not going to get into it.
Erin Welsh	Yeah but okay.
Erin Allmann Updyke	So I don't have an answer for you. And what determines whether or not it breaks spontaneously or has to be broken?
Erin Welsh	Yeah. Right.
Erin Allmann Updyke	Who knows? Do we know that? No. I don't know.

Erin Welsh	What percentage breaks spontaneously?
Erin Allmann Updyke	Erin, don't ask me that question.
Erin Welsh	Sorry!
Erin Allmann Updyke	Listen, in any case at some point the water is likely going to break. Sometimes it doesn't, babies can be born just fine in caul it's called, where they're born in the amniotic sac.
Erin Welsh	Oh yeah. There's a whole history we could talk about caul, yeah.
Erin Allmann Updyke	It's beautiful. But in any case when it does break, that allows for the fetal head to engage lower down in the pelvis, putting more pressure on the cervix, and helping to ensure that you're getting adequate dilation and effacement. What?
Erin Welsh	I have a question.
Erin Allmann Updyke	Give it to me.
Erin Welsh	It might be jumping ahead.
Erin Allmann Updyke	Okay.
Erin Welsh	Breech, number one.
Erin Allmann Updyke	Okay.
Erin Welsh	Number two, which, how, what facing? Facing baby head.
Erin Allmann Updyke	I have a baby. Do you want me to show you?
Erin Welsh	Yes, I would love that.
Erin Allmann Updyke	I have a baby here. Most of the time a baby should be facing, we like for them to be facing like this, if this is my body.
Erin Welsh	Okay.
Erin Allmann Updyke	So that they are facing down, their face is facing maternal backside.
Erin Welsh	Yeah.
Erin Allmann Updyke	And their occiput, which is the back part of their head, is anterior, meaning facing up towards my belly button.
Erin Welsh	Okay.

Erin Allmann Updyke	That is the easiest way for a baby to come out. They have to do some rotations within the pelvis in order to get there.
Erin Welsh	Yeah.
Erin Allmann Updyke	Which is very interesting. If a baby is facing the other way, so head up, which is how I was born, eyes up and open to the world, then it's a little bit harder because this forehead is wider. So it's just harder to push that through the canal first.
Erin Welsh	It's so interesting because I feel like you and I have talked about this where like primates, depending on the primate species, there's like different directions that tend for neonates to be born.
Erin Allmann Updyke	Yeah. Right.
Erin Welsh	And often like why we think that human childbirth is a cooperative process, is a social process is because of the direction.
Erin Allmann Updyke	Interesting.
Erin Welsh	And so it's like it can be more difficult to... You can't do that yourself very often.
Erin Allmann Updyke	It's harder to do yourself.
Erin Welsh	Yeah.
Erin Allmann Updyke	And also when your baby is born facing down, you can't see their face to be able to do things like clean their eyes, clean their mouth, things like that.
Erin Welsh	Exactly. And their mouth, yeah.
Erin Allmann Updyke	Which other primates can. Now if a baby is breech, that means that some part of their bottom or feet is what is facing down towards the cervix. There's a lot of different types of breech and I'm not an expert on it, so I don't remember the different names for all of it, whether it's like complete breech or footling or blah, blah, blah.
Erin Welsh	Okay.
Erin Allmann Updyke	But yeah, it's usually some combination of either their bottom or their feet or one foot or something like that.
Erin Welsh	Okay.
Erin Allmann Updyke	Breech babies are, we'll talk a little bit more about this but like you said, it is a slightly more difficult vaginal delivery. And so very, very often especially in the US it is recommended that people have a C-section if baby is breech and won't be turned around.
Erin Welsh	It won't be turned around prior to-
Erin Allmann Updyke	Prior to, yeah.

Erin Welsh	Okay, yeah.
Erin Allmann Updyke	And there's things; there's procedures that people can do to try and get baby to turn, it's called external cephalic version.
Erin Welsh	Right.
Erin Allmann Updyke	Where they basically push on the uterus and try.
Erin Welsh	Try to move it.
Erin Allmann Updyke	They usually give medicines to relax the tone of the uterus first to try and induce that baby to turn.
Erin Welsh	Yeah. What about shoulders?
Erin Allmann Updyke	Shoulder dystocia?
Erin Welsh	Yeah.
Erin Allmann Updyke	Okay, let's get... We're still in the first stage of labor, Erin.
Erin Welsh	Okay, sorry.
Erin Allmann Updyke	We haven't gotten there yet. Gosh.
Erin Welsh	We're in active labor, Erin.
Erin Allmann Updyke	So that was all the first stage of labor.
Erin Welsh	Yeah, yeah, okay.
Erin Allmann Updyke	I skipped ahead a little bit with that delivery question but once we've reached 10 centimeters, I'm going to treat this with more reverence, that is when we've entered the second stage of labor which is delivery.
Erin Welsh	Okay.
Erin Allmann Updyke	And I guess I kind of already went through some of this.
Erin Welsh	Okay.
Erin Allmann Updyke	But essentially delivery is going to go one of two ways. It's going to go vaginally or it's not, in which case it's going to go to a C-section.
Erin Welsh	Right.

Erin Allmann Updyke	So how long one ends up having to push in order to deliver a baby vaginally totally depends. It can be a few minutes, it can be several hours. It does tend to be a little bit longer that someone is pushing if they've had an epidural. And that's in part because it just makes it harder to know exactly where you are pushing because you can't feel as much because an epidural numbs you.
Erin Welsh	Right.
Erin Allmann Updyke	But that's the second stage of labor is delivery. Did I answer all of your questions about the modes and...?
Erin Welsh	I think so. I think so.
Erin Allmann Updyke	Great. But I do want to spend a little bit more time here not just talking about vaginal deliveries but also talking, like you said, Erin, about cesarean sections. Because sometimes we don't make it to this second stage of labor. Sometimes we don't make it all the way to 10 centimeters, sometimes we might not even make it to 6 centimeters. There's a lot of different things that can happen during that first stage of labor. So I want to take a minute to talk about C-sections, not the steps because you already did that but about how it is often decided whether or not to proceed with a cesarean section.
Erin Welsh	Yeah. Can I, before we do that because I do realize I had a question about labor.
Erin Allmann Updyke	Yeah.
Erin Welsh	Who is keeping track? And what... Yeah. How is that then sort of, yeah, I guess leading into this question of C-section.
Erin Allmann Updyke	Yeah. So I mean it is all going to depend on where you are and what your situation is, right. If you're delivering at home then it's just like you keeping track of the timing of your contractions, of how long those contractions are lasting, how frequently they're coming. And like maybe hopefully you have someone who's there with you who's checking your cervical dilation and effacement at regular intervals. If you're in the hospital, most of the time you will be attached to an electronic fetal monitor which is what you talked about.
Erin Welsh	Yeah.
Erin Allmann Updyke	That's going to be monitoring your contractions so you can see them on the monitor so we know are they getting closer together. The external ones cannot tell us how strong a contraction is because they're just measuring like tension externally.
Erin Welsh	Yeah.
Erin Allmann Updyke	The only way that we can actually measure the pressure that's being exerted on the fetus is through an internal monitor which we do have.
Erin Welsh	Are those continuous or intermittent?
Erin Allmann Updyke	They are continuous.
Erin Welsh	Okay.

Erin Allmann Updyke	Your water has to be broken to be able to get into the uterine cavity.
Erin Welsh	Got it.
Erin Allmann Updyke	But that's something that sometimes people end up having. Because let's say, for example, you're getting to that active phase of labor where we're expecting a certain amount of cervical change and it's not happening. So that might mean that even though you're contracting at intervals that seem regular, it might be that they're not strong enough to be inducing the cervical change. That might mean that we have medications that can help.
Erin Welsh	Yeah.
Erin Allmann Updyke	Because that's Pitocin or oxytocin is the one that we use most commonly because that is what stimulates contraction of the uterus. And so that's going to increase the power of those contractions to induce that cervical change.
Erin Welsh	Are you going to talk about intermittent vs continuous fetal monitoring?
Erin Allmann Updyke	I mean those are two options for monitoring.
Erin Welsh	Yeah but in terms of the decision making and what that tells us.
Erin Allmann Updyke	It's so variable.
Erin Welsh	Yeah.
Erin Allmann Updyke	That there's not like an easy answer that I have for that.
Erin Welsh	Okay.
Erin Allmann Updyke	It's going to vary hospital to hospital, it's going to vary provider to provider, and it's going to also depend on your individual risk situation.
Erin Welsh	Right.
Erin Allmann Updyke	Where most people if they have any degree of potential complications or like known complications, let's say that you have preeclampsia or you have gestational hypertension or something like that, more likely that someone's going to be recommended to have continuous fetal monitoring rather than if you were considered a low risk pregnancy.
Erin Welsh	Okay.
Erin Allmann Updyke	And again that low to high risk can change very quickly especially during labor.
Erin Welsh	Yep.

Erin Allmann Updyke	It also is of course going to depend on whether you came into labor spontaneously or whether you came in to be induced for some reason or another. And one of the ways that I have seen most people talk about it and one of the ways that I think about it that I think makes the most sense is that any time that a medical provider is going to be doing an intervention, then they most likely will want to have continuous monitoring at least for a time because I'm doing something that's going to potentially affect you and your baby.
Erin Welsh	Yeah.
Erin Allmann Updyke	So I want to know what effect that's having, if that makes sense.
Erin Welsh	Yeah, yeah. Yeah, it does.
Erin Allmann Updyke	So but it totally varies place to place.
Erin Welsh	Okay.
Erin Allmann Updyke	So don't ask me statistics. I will tell you some statistics about C-sections unless you have more questions about...
Erin Welsh	I'm sure that I will. But give me the stats.
Erin Allmann Updyke	Okay. So globally rates of C-sections are about 21% on average global. But that, like you mentioned, Erin, is not at all homogeneous. In places like sub-Saharan Africa, C-section rates are around 5%. In Latin America and the Caribbean, up to 42%, and like you said, Erin, even higher in some private hospitals. In various places in Europe we have huge variation depending on what geographic region, from like 24%-30%. All across Asia things can vary from like 12% -33%.
Erin Welsh	Wow.
Erin Allmann Updyke	It's like huge, huge amounts of variation.
Erin Welsh	Huge variation, yeah.
Erin Allmann Updyke	Australia and New Zealand are averaging around 33%.
Erin Welsh	Okay.
Erin Allmann Updyke	And then we in the US are in the 30% range right now.
Erin Welsh	Yeah.
Erin Allmann Updyke	It's been up and down the last few years. And like you said, the World Health Organization has a recommendation that no more than 15% of deliveries are by cesarean section. I don't know exactly how they came up with that number.
Erin Welsh	Yeah.

Erin Allmann Updyke	But it's my understanding that that number is based on data to try and match the risk-benefit ratio. How can we maximize health of both the mother and the baby and not increase the risks that we know are associated with cesarean section? Because there are.
Erin Welsh	Yeah, yeah.
Erin Allmann Updyke	And there are without a doubt circumstances where C-section has and will continue to save the life of either mother or baby or both.
Erin Welsh	Or both, yeah.
Erin Allmann Updyke	And there is no doubt about that.
Erin Welsh	Yeah.
Erin Allmann Updyke	But deciding exactly when that point is can sometimes be really tricky.
Erin Welsh	Yeah.
Erin Allmann Updyke	There are some cases that pretty universally we think and we know that a C-section is the most likely to save the life of mother and baby and is probably going to be recommended like across the board always with like no gray areas.
Erin Welsh	Yeah.
Erin Allmann Updyke	Ready for some of those factors?
Erin Welsh	Yeah I am.
Erin Allmann Updyke	That might be something like a placenta previa.
Erin Welsh	Yep.
Erin Allmann Updyke	Or a known placenta accreta spectrum disorder like we talked about. Those are situations that cesarean delivery is going to save the life of the baby and might also save the life of the mom. Because especially with placenta previa, which is where the placenta is covering the cervix, you can have significant hemorrhage which can be very dangerous for the mom as well as the baby.
Erin Welsh	Yeah.
Erin Allmann Updyke	Another one that might happen during the course of labor after that amniotic fluid sac is broken is called cord prolapse. And that is an absolute emergency where the umbilical cord comes out through the cervix before any part of the baby.
Erin Welsh	Okay.
Erin Allmann Updyke	And that is going to trap blood flow and block blood flow to the cord.
Erin Welsh	Right, yeah.

Erin Allmann Updyke	Which is extremely dangerous for the baby. So that is pretty universally an emergency C-section scenario. We also generally across the board recommend cesarean sections if there is a first time genital herpes outbreak.
Erin Welsh	Oh yeah.
Erin Allmann Updyke	Or an active genital herpes infection which people don't talk about that often.
Erin Welsh	Yeah, they really don't.
Erin Allmann Updyke	But that puts baby, if they're born vaginally, at a pretty high risk for herpes encephalitis. And so it's usually recommended to do a C-section if that is known to be happening. If somebody has had a prior uterine surgery, like a very large fibroid removal or a previous midline C-section.
Erin Welsh	Yep.
Erin Allmann Updyke	Because most of the time, if we look at our uterus again here-
Erin Welsh	Yeah.
Erin Allmann Updyke	Most of the time these days C-sections are done transverse. So they're cut across what's called the lower uterine segment. And that usually heals very well. And a second pregnancy after that is at lower risk of uterine rupture.
Erin Welsh	Yep.
Erin Allmann Updyke	Higher risk than with no surgery. But a midline, so an incision that goes from the top to the bottom of the uterus, is at very high risk for uterine rupture with the next pregnancy.
Erin Welsh	And so is the difference... So I know that today we do more transverse incisions. But historically we used to do midline. Is there any reason to do midline that like people do midline today?
Erin Allmann Updyke	Usually it's if the baby is very small, so like very premature, then it might be really difficult to get to that lower uterine segment because it's just not up like above the pubic bone.
Erin Welsh	Got it.
Erin Allmann Updyke	So it's harder to access. And there might be other like anatomic reasons that it has to be done.
Erin Welsh	Okay.
Erin Allmann Updyke	I'm not a surgeon, so that's not on me. It's a good question though. And so in those cases people are usually scheduled for like a planned C-section, that is to avoid labor because the contractions of labor can be very risky.
Erin Welsh	Yeah.

Erin Allmann Updyke	And like we talked about already, in most cases babies who are breech, booty down or feet down instead of head down, C-section is often recommended. And it's not because it's impossible to deliver a vaginal breech delivery but it's for a few reasons. There's some data from a few studies in the US at least that it is... Studies that were looking at a planned cesarean delivery for a breech baby vs a planned vaginal delivery, whether or not that ended in a vaginal or a C-section, right. Because you might plan for vaginal and end up having a C-section. That data suggested that it was marginally safer to do a planned cesarean section in the immediate term.
Erin Welsh	Okay.
Erin Allmann Updyke	And so because of that, for a while it was like kind of across the board recommended that you do C-sections for breech deliveries if they cannot be rotated by that external cephalic version.
Erin Welsh	Yeah.
Erin Allmann Updyke	And that recommendation plus the fact that breech deliveries are rare. I don't have an exact number on that but most of the time babies end up head down.
Erin Welsh	Yeah.
Erin Allmann Updyke	And so a breech presentation is relatively rare. And with those two things combined, less and less obstetricians and midwives have experience in vaginal breech deliveries which then makes them riskier because if you haven't practiced that hands on, then you don't have as much experience with it, it's more likely that something is going to go wrong. So that is a big reason why most of the time people are recommended to get a C-section if they're known to have a breech baby.
Erin Welsh	Yep.
Erin Allmann Updyke	Does that make sense?
Erin Welsh	It does make sense, yeah. I mean it's a big part of just this is a tool that we use.
Erin Allmann Updyke	Exactly.
Erin Welsh	And so yeah. And so because we have this option-
Erin Allmann Updyke	Exactly.
Erin Welsh	We don't have to necessarily explore the option of that. That is very risky.
Erin Allmann Updyke	It is, it is, it absolutely is. And there might be others that I have missed in terms of what the more like clear cut recommendations are.
Erin Welsh	Right.
Erin Allmann Updyke	But a lot of the C-sections that are done, and in a lot of cases in studies that have looked at this and it really varies location to location, but in a lot of cases most C-sections are not necessarily done for those reasons. They are done for reasons that fall more in this gray area in terms of who makes that decision and what point is that decision made.

Erin Welsh	Right.
Erin Allmann Updyke	And those are for indications like failure to progress, failure of an induction of labor, arrest of dissent. So that means baby doesn't come all the way down the birth canal and gets stuck.
Erin Welsh	Stuck, yeah.
Erin Allmann Updyke	Or fetal intolerance of labor which means we're monitoring and we see that baby's heart rate is tanking and not coming back up.
Erin Welsh	Yeah.
Erin Allmann Updyke	And so those are a lot of the main reasons that we see in studies that have looked at like what are the reasons for surgery in these cases. But those are more gray areas. And in some of those cases it might be that we are saving lives but who and when and why?
Erin Welsh	Yeah.
Erin Allmann Updyke	Like it's just a harder place to make that decision.
Erin Welsh	Yeah.
Erin Allmann Updyke	And it's much more an individual decision in that gray area, right.
Erin Welsh	Yeah, like individual meaning dependent upon the specific situation.
Erin Allmann Updyke	Specific situation, right. The person who is in labor-
Erin Welsh	Yeah.
Erin Allmann Updyke	The person who is going to be doing that C-section or vaginal delivery and like what their comfort level is.
Erin Welsh	Yeah. Right.
Erin Allmann Updyke	Right? And so that's also I think when you see the most potential for trauma associated with it in terms of how I'm going to experience that.
Erin Welsh	Yeah.
Erin Allmann Updyke	Because it is usually not planned in those scenarios.
Erin Welsh	Right. It's tough because whose responsibility is that? And then I feel like there's a lot of blame associated with it and a lot of trauma associated with like the questions. Why didn't I do this? Why didn't I ask this? Why didn't my doctor do this? Why didn't my doctor tell me this?
Erin Allmann Updyke	Yeah.

Erin Welsh	And it's so like... How do we fix that? Even beyond making sure that we're reading fetal monitoring correctly, right, or we're using continuous vs intermittent or like all of these indications.
Erin Allmann Updyke	Right.
Erin Welsh	Beyond measuring those, how do we then make sure that everyone as much as we can is okay with this decision?
Erin Allmann Updyke	Right. I mean that comes down to communication, Erin, let's be honest.
Erin Welsh	Yeah, it's a big part of it.
Erin Allmann Updyke	It's a big part of it. But then there's another piece that we haven't really got into and that is elective cesareans.
Erin Welsh	Yes.
Erin Allmann Updyke	And that can be a first time delivery with an elective cesarean or what's called sometimes an elective repeat cesarean. So say whatever the reason was you ended up with a C-section your first time and then you decide to schedule a C-section for your second or third or whatever delivery. Now I think that in this scenario sometimes, just like with so many of the indications that we have, there is a lot of judgment that is placed on that.
Erin Welsh	Yeah.
Erin Allmann Updyke	And sometimes it can get to the point where we have to kind of take a step back and say, like you said, who is making this decision?
Erin Welsh	Yeah.
Erin Allmann Updyke	If we believe, which I do, that somebody should have the right to decide whether or not they want to become pregnant or carry a pregnancy to term or not, then shouldn't they also have the right to decide whether or not they want to attempt a vaginal delivery or not? Is that a crazy concept?
Erin Welsh	Today it is, yes.
Erin Allmann Updyke	It can be. But I think that that part is often missing honestly.
Erin Welsh	Yeah.
Erin Allmann Updyke	And we can focus a lot on the potential risks of C-section, and they do exist, there are also risks associated with vaginal deliveries.
Erin Welsh	Of course.
Erin Allmann Updyke	And so I think that if we are not underselling the potential risks and complications of this major abdominal surgery, then it should be a person's right to decide what they do.

Erin Welsh	Yeah. And not be judged for that too.
Erin Allmann Updyke	And not be judged for that.
Erin Welsh	Okay, do you remember Gilmore Girls, Sherry, who is Christopher's wife or something?
Erin Allmann Updyke	Oh vaguely, yes. Yeah, yeah, yeah.
Erin Welsh	And she was very much like the show was making fun of her because she had a planned elective C-section.
Erin Allmann Updyke	Planned C-section. Yeah!
Erin Welsh	And then she ended up going into labor early and had a vaginal birth, I think that's what I remember.
Erin Allmann Updyke	I don't remember that.
Erin Welsh	But just like that alone, that representation of like here's this ridiculous type A personality, blah, blah, blah.
Erin Allmann Updyke	Right.
Erin Welsh	She wants a C-section. That is who is electing for a C-section.
Erin Allmann Updyke	Right.
Erin Welsh	And then the judgment inherent.
Erin Allmann Updyke	The judgment inherent to that.
Erin Welsh	Yeah.
Erin Allmann Updyke	It's like we just can't win one way or the other. Right?
Erin Welsh	No! That's the ultimate lesson.
Erin Allmann Updyke	If you plan for a vaginal delivery and then you had a C-section, you're getting judged for that or you feel judged for that.
Erin Welsh	Yeah, right.
Erin Allmann Updyke	If you plan for a C-section, you're judged. We just can't win.
Erin Welsh	We can't win. Yeah.
Erin Allmann Updyke	God, goodness gracious.
Erin Welsh	I know.

Erin Allmann Updyke	Erin.
Erin Welsh	Erin.
Erin Allmann Updyke	I want to move on.
Erin Welsh	Okay.
Erin Allmann Updyke	Can we?
Erin Welsh	Sure.
Erin Allmann Updyke	Okay. Do you have any other questions?
Erin Welsh	Probably.
Erin Allmann Updyke	I have other things about C-sections like the risk of this and like the effects on the child.
Erin Welsh	Right. I have a question about how we classify C-sections because a lot of people use the phrase 'emergency C-section'.
Erin Allmann Updyke	Okay.
Erin Welsh	Is that unplanned? And then there's stages of unplanned that's like urgent, extra urgent, super urgent.
Erin Allmann Updyke	Erin.
Erin Welsh	Yeah.
Erin Allmann Updyke	I tried to get you data on this.
Erin Welsh	Yeah.
Erin Allmann Updyke	I read a whole paper that was about the classifications of how we classify a C-section.
Erin Welsh	Yeah.
Erin Allmann Updyke	It is a disaster.
Erin Welsh	Of course.
Erin Allmann Updyke	Both in terms of like sometimes they're just classified by indication like we talked about.
Erin Welsh	Yeah, yeah, yeah.

Erin Allmann Updyke	The indication for the C-section was failure to progress or whatever it was, fetal intolerance of labor. Sometimes they're classified by urgency. This was an emergent, this was an urgent, this was a planned. Okay?
Erin Welsh	Got it.
Erin Allmann Updyke	Sometimes they're classified by the status of the pregnant person. So this was a person with preeclampsia. This was whatever. This paper alone had like 27 different systems of classification. So I don't know.
Erin Welsh	Okay. Planned and unplanned is like the general big picture breakdown.
Erin Allmann Updyke	Planned, unplanned. But it is true that if you can think of some of the scenarios that I gave of like this would 100% of the time be recommended for C-section, like a cord prolapse-
Erin Welsh	Yep.
Erin Allmann Updyke	That would be an emergency scenario.
Erin Welsh	Yes.
Erin Allmann Updyke	Because you have a cord that is being compressed.
Erin Welsh	Right.
Erin Allmann Updyke	So yes, there are scenarios that are like well your baby is not looking great, so we might say let's do this urgently but we're not like everyone's sprinting.
Erin Welsh	Yeah.
Erin Allmann Updyke	And yeah, it's true that there's a huge range.
Erin Welsh	Yeah. There's a range.
Erin Allmann Updyke	Yeah.
Erin Welsh	Okay.
Erin Allmann Updyke	There's also sometimes, and we kind of skipped over this, what are called operative vaginal deliveries.
Erin Welsh	Ooh, tell me more about that.
Erin Allmann Updyke	And that doesn't necessarily mean there's an operation.
Erin Welsh	Yeah.
Erin Allmann Updyke	But it just might mean that somebody is having a vaginal delivery and the baby is having a hard time descending that birth canal, so there are things that can be done to help that process.

Erin Welsh	Okay.
Erin Allmann Updyke	Sometimes it's forceps.
Erin Welsh	We still...
Erin Allmann Updyke	We still use forceps.
Erin Welsh	What percentage? And I'm sure that it varies globally, blah, blah, blah.
Erin Allmann Updyke	There's no numbers. Yeah. I don't have numbers on that because also it just varies hospital to hospital.
Erin Welsh	Right. And training. How much training does an OB get for using forceps?
Erin Allmann Updyke	The place that I worked there was someone who really was very adept at forceps and so would use them very frequently. So I know that the trainees there got a lot of training with forceps, at other places they might not. They might use what's called a vacuum. This is what it looks like if you're seeing this on video. It basically is a little disc, a plastic disc that sometimes has a bit of foam in the middle.
Erin Welsh	Okay.
Erin Allmann Updyke	This is placed on the baby's head here.
Erin Welsh	Yeah.
Erin Allmann Updyke	And then you basically pump this up and it suctions itself to the baby's head. And then you're able to use that to pull the baby down to basically provide traction to help that baby descend.
Erin Welsh	Yeah. Erin, what about the soft spot?
Erin Allmann Updyke	So they can get a little bit of a hematoma there.
Erin Welsh	Okay.
Erin Allmann Updyke	Yeah. But they usually do great.
Erin Welsh	Wow.
Erin Allmann Updyke	So yeah, so there's a lot of reasons why somebody might need a little bit of additional assistance but not to the point of a C-section. And it's all going to depend on the individual scenario and how far you've progressed in labor up to that point.
Erin Welsh	Right. Okay.
Erin Allmann Updyke	Okay but all of that was still just the second stage of labor. We have a whole other stage to go. The third and final stage of labor is delivery of the placenta.

Erin Welsh	Yeah.
Erin Allmann Updyke	And that can take anywhere from like a couple of minutes to a half an hour or so.
Erin Welsh	Interesting.
Erin Allmann Updyke	Most of the time the placenta detaches all on its own. Sometimes it doesn't and it might get stuck and then it might require manual removal which can be quite uncomfortable. And then like we talked kind of a lot about already, sometimes it might have gone too deep into the myometrium and actually have extended too far and might require surgery to remove.
Erin Welsh	Okay.
Erin Allmann Updyke	Or in very extreme cases it might require a hysterectomy.
Erin Welsh	Okay.
Erin Allmann Updyke	The reason that the removal of the placenta is so important is because without the placenta removed, you cannot stop the bleeding. So I want to talk about blood for a second.
Erin Welsh	Yeah.
Erin Allmann Updyke	If we remember last episode, our blood volume during pregnancy has increased by about 50%. At term your uterus is receiving 12%-20%, depending on which papers you read, of your total blood flow, your total cardiac output. Which is like 700 mL every minute.
Erin Welsh	That's wild.
Erin Allmann Updyke	With every contraction-
Erin Welsh	Yeah.
Erin Allmann Updyke	Your uterus is shunting 300-500 mL of blood back into your circulation because it's just basically pushing out all of this blood like it's a sponge that you're wringing out.
Erin Welsh	Yeah.
Erin Allmann Updyke	So immediately after delivery of the placenta, you have all of these spiral arteries in your uterus that have become enlarged in order to provide constant blood flow to the placenta. These have to find a way to stop. Because if they do not stop, then you are continuing to just bleed.
Erin Welsh	Yeah. You're just gonna... Yeah.
Erin Allmann Updyke	So to do that, your uterus has to clamp down very quickly. And it usually does and it's phenomenal. Like after that placenta is out, your uterus goes from like the size of a watermelon-
Erin Welsh	Yeah.
Erin Allmann Updyke	To like the size of a, I don't know, miniature basketball.

Erin Welsh	Yeah, yeah.
Erin Allmann Updyke	Very quickly. But sometimes it doesn't. And postpartum hemorrhage, which is defined as the loss of more than 1 L of blood-
Erin Welsh	Okay.
Erin Allmann Updyke	Regardless of the method of delivery, it used to be defined differently for a C-section versus a vaginal delivery.
Erin Welsh	Okay.
Erin Allmann Updyke	But it's not because now we know we can do C-sections with very little blood loss.
Erin Welsh	Yeah.
Erin Allmann Updyke	Postpartum hemorrhage, 1 L of blood. Even that much blood loss, a lot of times people are not symptomatic because of how much blood volume you have. Which also means that people can lose a very significant amount of blood during the delivery process.
Erin Welsh	Okay, okay.
Erin Allmann Updyke	If things go wrong.
Erin Welsh	So because someone who is pregnant and at term has so much more blood than someone who is not pregnant-
Erin Allmann Updyke	And so much is going to the uterus.
Erin Welsh	Yes. And so then the blood loss is not like as severe as it would be or like the consequence of it is not as severe as it would be if someone was the same amount of blood lost.
Erin Allmann Updyke	The same, yeah.
Erin Welsh	Because you have more blood that you can lose.
Erin Allmann Updyke	You have more blood that you can lose and you can lose way too much blood very quickly.
Erin Welsh	Yes.
Erin Allmann Updyke	So it's like both and.
Erin Welsh	Yes, yes, yes.
Erin Allmann Updyke	Yeah.
Erin Welsh	Okay.

Erin Allmann Updyke	And so that's why the limit is like 1 liter. 1 liter is a lot of blood.
Erin Welsh	1 liter is a ton of blood.
Erin Allmann Updyke	It's so much blood.
Erin Welsh	Yeah.
Erin Allmann Updyke	But a lot of times people are maybe not symptomatic until they lose like 1.5 L or even 2 L of blood which is like 25% of your total blood volume.
Erin Welsh	Yeah, it's a huge amount of blood.
Erin Allmann Updyke	It's a huge amount of blood. So postpartum hemorrhage is estimated to affect anywhere from 3%-10% of deliveries but it accounts for 20% of maternal deaths worldwide. In high income countries that number is less in large part because we have really good options on how to stop postpartum hemorrhage.
Erin Welsh	Okay.
Erin Allmann Updyke	Though the rate of hemorrhage has been on the rise. In the US from 1993-2014, the rate of hemorrhage that required a blood transfusion, which is like that means it's a pretty severe hemorrhage-
Erin Welsh	Yeah.
Erin Allmann Updyke	Increased from 8 per 10,000 deliveries to 40 per 10,000 deliveries in the US.
Erin Welsh	What?
Erin Allmann Updyke	So...
Erin Welsh	Why?
Erin Allmann Updyke	People are bleeding more in part probably because of other risk factors that are associated, right, things like placenta accreta spectrum disorders which are on the rise, preeclampsia, a lot of these are risk factors for postpartum hemorrhage.
Erin Welsh	Okay.
Erin Allmann Updyke	There's four main things that we think of as like causal for postpartum hemorrhage. Most of the time it's because of uterine atony, it's because of that uterus not clamping down to the size of a small basketball the way that it ought to.
Erin Welsh	Right.
Erin Allmann Updyke	Because then you just have so much blood being shunted to the uterus and it's just flowing out.
Erin Welsh	And it's just flowing out, yeah.

Erin Allmann Updyke	Because these arteries are not being clamped down. And the risks for having a uterus that has a hard time clamping down might be a retained placenta, so a little piece of it that hasn't come off-
Erin Welsh	Yeah.
Erin Allmann Updyke	Or a prolonged labor. Definitions vary on that. Gestational diabetes is a risk for this, any kind of hypertensive disorders, and then there are probably other factors as well. But the other main factors that contribute to postpartum hemorrhage are things like trauma, so maybe lacerations. So that might not be even bleeding from the uterus but just bleeding from elsewhere from lacerations. Retained placenta or retained blood clots even that can just prevent that uterus, so it's like it's trying to clamp down but there's something blocking it.
Erin Welsh	There's something stuck, yeah.
Erin Allmann Updyke	And then also what they call thrombin or clotting factor deficiencies which are not that uncommon.
Erin Welsh	Which is... Okay, like in general.
Erin Allmann Updyke	In general.
Erin Welsh	Not, okay. Got it.
Erin Allmann Updyke	Yeah. Those are more like genetic susceptibilities.
Erin Welsh	Right, okay.
Erin Allmann Updyke	Yeah. And there are a lot of different medications that we can now use to help stop the bleeding, to either induce contraction, and then also like devices like balloons and things like that that we can use to clamp down and block off those arteries. Or in some cases people might need to have what's called a uterine artery embolization. So they put like a coil in to help block blood flow to the arteries so you're not getting as much flow to that area.
Erin Welsh	Yeah. Okay.
Erin Allmann Updyke	And those kinds of developments are why we've seen a reduction in the mortality from hemorrhage.
Erin Welsh	I see, okay.
Erin Allmann Updyke	Even as we've seen an increase in the risk of hemorrhage.
Erin Welsh	Increase in the actual prevalence. Okay.
Erin Allmann Updyke	Yeah.
Erin Welsh	Okay.

Erin Allmann Updyke	But in the event that all of that happens well enough and a baby is delivered one way or another, vaginally, spontaneously, vaginally operatively, so with assistance, or a C-section, after that third stage of labor, pregnancy is done. Or is it?
Erin Welsh	Or is it?
Erin Allmann Updyke	But that's where we'll pick up next week.
Erin Welsh	Okay, I have a couple of questions that I jotted down.
Erin Allmann Updyke	Okay. I saw you writing.
Erin Welsh	Yeah. I didn't want to forget. Back labor.
Erin Allmann Updyke	Ah okay. So back labor just means that you're feeling the contractions primarily in your back rather than feeling them across your abdomen.
Erin Welsh	Okay. Okay.
Erin Allmann Updyke	Why does it happen? I don't know, is it just anatomic sometimes or etc? Sometimes people will say it's more based on position of the baby.
Erin Welsh	Okay.
Erin Allmann Updyke	So if the baby is OP, so occiput back and face up, then sometimes people are more likely to have back labor. Doesn't necessarily mean baby will come out that way because they rotate this way quite a lot during labor and delivery.
Erin Welsh	Spiral.
Erin Allmann Updyke	They spiral. Yeah, they don't like tend to flip upside down, though sometimes they do. Sorry, baby.
Erin Welsh	Okay. Back labor.
Erin Allmann Updyke	Yes, back labor.
Erin Welsh	Tearing. Let's talk about tearing.
Erin Allmann Updyke	Okay.
Erin Welsh	Let's talk about episiotomies.
Erin Allmann Updyke	Okay. I have a little bit of extra notes here just for you, Erin.
Erin Welsh	You know me.

Erin Allmann Updyke	I do know you. An episiotomy means that somebody makes a cut, makes an incision in the perineum, in the skin of the perineum. So that's the space of skin between the opening of the vagina and the opening of your anus. They have very much fallen out of favor.
Erin Welsh	Yeah, they have.
Erin Allmann Updyke	They used to be quite common.
Erin Welsh	You know that no one did a study on them until the 1970s about are these something we should be doing?
Erin Allmann Updyke	Helpful? Not surprised at all. I have had the fortune of working with some pretty phenomenal OBGYNs in my training and one that I worked with explained it to me very well, I think, as an episiotomy is helping to increase soft tissue. Right?
Erin Welsh	Yeah.
Erin Allmann Updyke	Because it's basically it's only skin, so you're cutting in skin.
Erin Welsh	Right.
Erin Allmann Updyke	Most of the time if a baby is having trouble descending to the birth canal... Shall I get out my pelvis model?
Erin Welsh	Yes, please.
Erin Allmann Updyke	I have a very large pelvis here. Most of the time if a baby is having trouble descending the birth canal, it's not soft tissue of your perineum that's causing the trouble or even the tissue of the vaginal canal itself.
Erin Welsh	Right.
Erin Allmann Updyke	It's your bones.
Erin Welsh	Yeah.
Erin Allmann Updyke	Right? So episiotomies don't help with any of that.
Erin Welsh	Right. It's our bipedalism.
Erin Allmann Updyke	It's our bipedalism. And so because of that they have very much fallen out of favor. They make it easier for somebody to use their hands in the vaginal canal to help in the case of a difficult delivery. So it's not that they're never done. They also increase the risk of 4th degree tears which is a tear that goes all the way into the anal sphincter itself.
Erin Welsh	Yeah.
Erin Allmann Updyke	And can have severe longtime consequences like an increased risk of fecal incontinence, fistula formation, other things like that.

Erin Welsh	Yeah. Yeah. I mentioned fistula. What is a fistula?
Erin Allmann Updyke	A fistula is any connection between two places that doesn't belong. So most often in the case of like after a vaginal delivery, you might have a fistula into the anal canal or something like that, like from the rectum into the vagina or something like that.
Erin Welsh	Right.
Erin Allmann Updyke	Very, very uncommon these days.
Erin Welsh	These days.
Erin Allmann Updyke	Used to be much, much more common. Very, very uncommon these days.
Erin Welsh	Yeah, there's like whole instruments, pessaries that people-
Erin Allmann Updyke	Yes.
Erin Welsh	There were hundreds of variations of these that people would use to prevent... And also uterine prolapse and so on and so forth.
Erin Allmann Updyke	Right, yeah.
Erin Welsh	So it's just like...
Erin Allmann Updyke	So yes, C-sections have definitely reduced the risk of those kinds of things for sure.
Erin Welsh	Yes, yes.
Erin Allmann Updyke	But yes. But some degree of tearing is often... It's really common. And we call them different degrees based on how deep they go essentially. So whether it's just a skin tear, like just a small superficial tear, that's called the first degree.
Erin Welsh	Yeah.
Erin Allmann Updyke	A second degree tear goes through into the perineum, so into that space between the opening of the vagina and the anus.
Erin Welsh	Okay.
Erin Allmann Updyke	A third degree will go into the muscle but not all the way to the anal sphincter.
Erin Welsh	Got it.
Erin Allmann Updyke	And then a fourth degree goes all the way into that.
Erin Welsh	All the way, okay.
Erin Allmann Updyke	So episiotomies have definitely fallen out of favor but they're still used in some places. Yeah.

Erin Welsh	I didn't even mention the husband stitch but we're not going to go there.
Erin Allmann Updyke	Nope, we won't.
Erin Welsh	You can google that and be horrified.
Erin Allmann Updyke	Other questions, Erin?
Erin Welsh	I don't think so.
Erin Allmann Updyke	Okay.
Erin Welsh	I think, yeah.
Erin Allmann Updyke	It was a lot. I probably could have covered even more but listen.
Erin Welsh	There's so much to cover.
Erin Allmann Updyke	I know.
Erin Welsh	Yeah.
Erin Allmann Updyke	I didn't even talk about epidurals but that's for a future episode on anesthesia.
Erin Welsh	Yeah, we really need to do episodes. I want to talk about twilight sleep in more detail.
Erin Allmann Updyke	Oh my gosh.
Erin Welsh	I want to talk about the development of epidurals. Yeah.
Erin Allmann Updyke	Yeah.
Erin Welsh	There's a lot.
Erin Allmann Updyke	There's a future episode, Erin.
Erin Welsh	It is, it is.
Erin Allmann Updyke	We have a lot that you can learn more about just by reading the sources that we read.
Erin Welsh	We read some great sources. So let me shout out a few. I already mentioned the two books that I read, 'Invisible Labor' by Rachel Sommerstein and 'Cesarean Section' by Jacqueline Wolf. But I also want to shout out a couple other papers here. One is by Dunsworth and Eccleston called 'The Evolution of Difficult Childbirth and Helpless Hominid Infants' from 2015.
Erin Allmann Updyke	Okay.

Erin Welsh	And then a paper by Rosenberg and Trevathan titled 'Birth, Obstetrics, and Human Evolution' from 2002. Interesting stuff.
Erin Allmann Updyke	Okay. I had a number of papers for this, a few that I will shout out. One was just from the New England Journal of Medicine from 1999 called 'The Control of Labor', pretty basic but a good overview of labor and what we think we know about it. One that I loved was from the Journal of Perinatal Medicine called 'Cesarean section one hundred years 1920-2020: the Good, the Bad and the Ugly'.
Erin Welsh	Oh I read that one.
Erin Allmann Updyke	It was really good.
Erin Welsh	Yeah, it's a good one.
Erin Allmann Updyke	I really loved it. A review of postpartum hemorrhage titled 'Postpartum Hemorrhage' from the New England Journal of Medicine 2021. And then a paper that I didn't even get into this but is very interesting was from 2018 in PLOS Medicine called 'Long Term Risks and Benefits Associated with Cesarean Delivery for Mother, Baby, and Subsequent Pregnancies: Systematic Review and Meta-analysis'. And I didn't get into it but there is a lot.
Erin Welsh	Yeah.
Erin Allmann Updyke	Most of the data on C-sections really focuses on short term risks and benefits.
Erin Welsh	Yeah.
Erin Allmann Updyke	And there's not as much known about long term risks and benefits.
Erin Welsh	Right.
Erin Allmann Updyke	And so this paper was interesting for that perspective.
Erin Welsh	Well and that's something that I feel like I thought... Now I do have another question. Is like this aspect of short vs long term, because I think one of the things that often gets mentioned is like vaginal microbiome and stuff like that.
Erin Allmann Updyke	Yeah.
Erin Welsh	And it's like what are the long term outcomes? We talk about oh well the risks of... You're going through your notes.
Erin Allmann Updyke	Going back to my notes, keep going.
Erin Welsh	I've got notes.
Erin Allmann Updyke	Yeah.
Erin Welsh	Yes, we talk about okay, well are there long term associations with allergies, autoimmune disorders, stuff like that that often gets linked but we don't... How is the data actually?

Erin Allmann Updyke	How is the data, Erin?
Erin Welsh	Yeah.
Erin Allmann Updyke	Okay. So there is data to support the idea that C-sections might be associated with a slightly increased risk of asthma and other atopic diseases for the baby during childhood.
Erin Welsh	Okay.
Erin Allmann Updyke	That data does not, it's not super strong like going all the way to adulthood, if that makes sense. Where like adults are not necessarily at higher risk of asthma and allergies if they were born by C-section. But it's also in part like we just don't have studies that show that. This idea of like a microbiome association, people really like this idea. There is data that there is a shift in the microbiome of babies who are born via the abdominal route, so via a C-section, compared to babies who are born via vaginal delivery. But we do not have data to show any long-term effects of this. We don't know that that is why we see this slightly increased risk of atopic diseases. Like there's no causal link that we have there, it's all correlation.
Erin Welsh	Yeah.
Erin Allmann Updyke	And there is right now no data to suggest that vaginal seeding, so like taking swabs from the vagina and putting it on a baby who was born C-section-
Erin Welsh	Yeah.
Erin Allmann Updyke	That's not recommended at least by ACOG right now because we do not have data that it is safe or effective.
Erin Welsh	Okay. The microbiome is just one of those words that-
Erin Allmann Updyke	It's super.
Erin Welsh	Yeah. Means many different things.
Erin Allmann Updyke	Yeah. And we just don't have data on it.
Erin Welsh	We don't have data.
Erin Allmann Updyke	Right?
Erin Welsh	And it's so complex to do the data. Yeah.
Erin Allmann Updyke	Right. And again, it's like you also have to take into account the short term risks and benefits and you can't just only think about these long term things.
Erin Welsh	Yeah.
Erin Allmann Updyke	Like it is all very nuanced.

Erin Welsh	Yes.
Erin Allmann Updyke	And there's not like a right or a wrong or a whatever.
Erin Welsh	Right.
Erin Allmann Updyke	It is all childbirth.
Erin Welsh	It's all childbirth. I mean I think also the effect size is the other thing that we just don't have a good handle on.
Erin Allmann Updyke	Right, definitely not.
Erin Welsh	Yeah.
Erin Allmann Updyke	Definitely not, definitely not. So.
Erin Welsh	So.
Erin Allmann Updyke	Yeah. Erin.
Erin Welsh	I feel like I have more to say but I guess there's one more episode to say it all!
Erin Allmann Updyke	Listen, we've got a whole other episode. So say it next week.
Erin Welsh	Yes. A big huge thank you, really like we don't have the words to thank all of the providers of our firsthand accounts, it really means the world to us to have you share your stories.
Erin Allmann Updyke	It does. Thank you, thank you, thank you. Thank you.
Erin Welsh	Thank you.
Erin Allmann Updyke	Thank you also to everyone here at Exactly Right studios. We've got Lianna, we've got Jessica, we've got Brent, we've got Craig, we've got everyone who's been involved.
Erin Welsh	So many amazing people here.
Erin Allmann Updyke	Thank you guys so much.
Erin Welsh	Yes, thank you. Thank you also to Bloodmobile for providing the music for this episode and all of our episodes.
Erin Allmann Updyke	And thank you to you, listeners.
Erin Welsh	For listening.
Erin Allmann Updyke	We've had a lot of fun doing these episodes. We've got one more still to come.
Erin Welsh	Yeah. We hope you learned something or something. I don't know.

Erin Allmann Updyke	Yeah, yeah. Tell us.
Erin Welsh	Yeah, tell us what you think.
Erin Allmann Updyke	If you loved or hated it. Okay?
Erin Welsh	Yeah. Either way.
Erin Allmann Updyke	And a special thank you as always to our patrons.
Erin Welsh	To our patrons. Really your support means so much to us.
Erin Allmann Updyke	It does.
Erin Welsh	We appreciate it.
Erin Allmann Updyke	Thank you.
Erin Welsh	Well until next time, wash your hands.
Erin Allmann Updyke	You filthy animals.